TINKER TO EVERS TO CHANCE P. 6 • GUATEMALA'S "DISAPPEARED" P. 14

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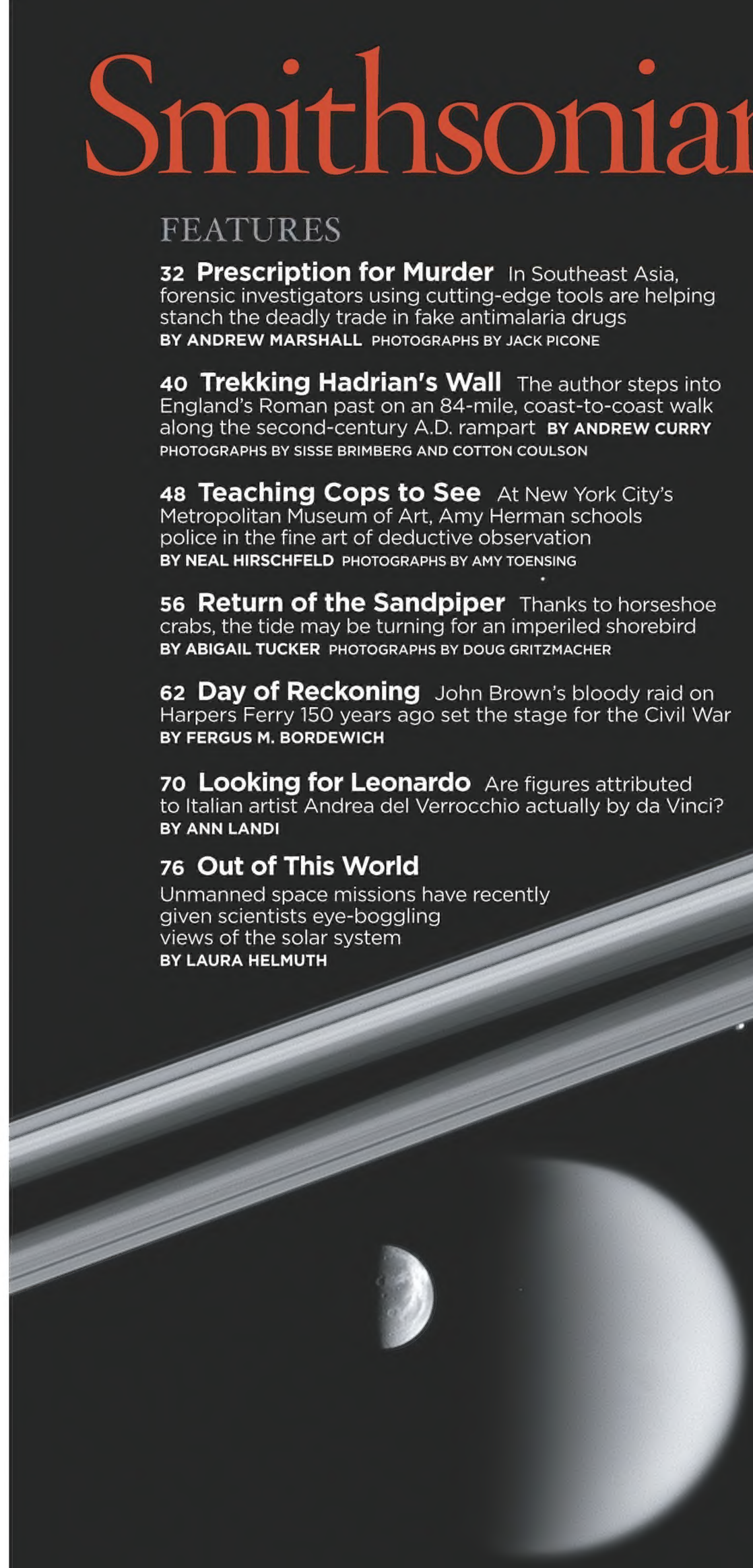

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PHOTOGRAPH BY SISSE BRIMBERG AND COTTON COULSON

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PHOTOGRAPH BY SPACE SCIENCE INSTITUTE / JPL / NASA

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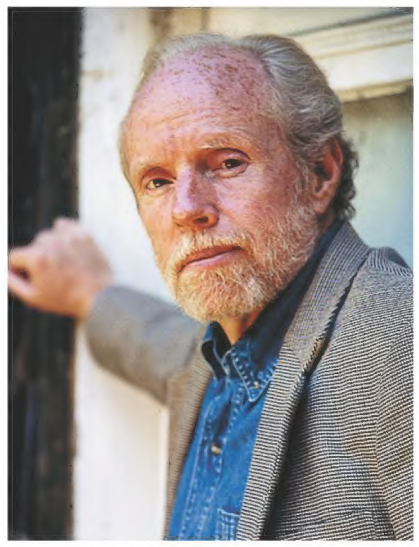
FROM THE EDITOR

Fevers

Temperatures at the Boiling Point

BY CAREY WINFREY

FERGUS M. BORDEWICH, who writes frequently for SMITHSONIAN about history, takes up the case of extremist abolitionist John Brown, whose fateful raid on a federal arsenal at Harpers Ferry, Virginia, 150 years ago this month exacerbated tensions leading up to the Civil War ("Day of Reckoning," p. 62). The author of a history of the Underground Railroad, *Bound for Canaan: The Underground Railroad and the War for the Soul of America,* Bordewich says Brown is among the most notable American figures, one whose significance is still debatable: "He has been seen in a remarkable number of ways in different eras, as a saint, a hero, a demon, a traitor, an enlightened forerunner of modern civil rights and tolerance, a troublemaker, terrorist and madman. Even people who admire him are not entirely comfortable." For his part, Bordewich came away from the story surprised by Brown's personal tolerance: "That is to say, he had among his friends and followers people of various religious persuasions, as well as atheists and agnostics. He hated slavery, but he was not a bigoted man."



Bordewich: Surprised

AFTER SENIOR EDITOR MARK STRAUSS got word of an extraordinary scientific investigation into counterfeit malaria medicines in Southeast Asia, he called on British freelance writer Andrew Marshall to pursue the story ("Prescription for Murder," p. 32). Marshall says he was stunned by "the sheer awfulness of people making money off a product that can actually kill people. When people buy fake Gucci handbags, they often know they're fakes. But they don't buy fake drugs knowing that they're fake." Marshall says many people in rural Cambodia and Myanmar can't afford treatment, so malaria becomes a way of life. "I spoke to farmers who had had it not just once or twice or three times, but four, five, six, seven, eight times. One of the women I spoke to had obviously been sick for a long time, but she had to continue working while extremely sick just so she could get the money together to seek treatment. To me, somebody who has to do that is both sobering and inspirational."

TIME IS RUNNING OUT on our 7th Annual Photo Contest, which closes for entries December 1. You can check out our rules at Smithsonian.com/photocontest and view some promising entries under "Editors' Picks." And, in Washington, D.C., don't miss the exhibition of this year's winners and finalists at the Smithsonian Castle on the National Mall, through January 17.

Smithsonian magazine 7TH ANNUAL PHOTO CONTEST

JACK BARSCHI

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DOUG GRITZMACHER

LETTERS READERS RESPOND TO THE **JULY** AND **AUGUST** ISSUES

There are two tiers of Colorado towns: those for the rich and those for the rest of us. In Telluride ["Out of the Box"], a ski lift ticket costs $100 and the average price of real estate is $1 million. Folks mention the town in the same breath as Aspen. For a taste of mountain life in southwest Colorado that isn't "Aspenized," try Lake City, Creede, Rico or Silverton. **ADAM SICKMILLER,** SILVERTON, COLORADO

KICKING FOR KHRUSHCHEV

HAVING DANCED in the film *Can-Can*, I read every word of "Nikita in Hollywood" with relish. When we learned we would be dancing for Khrushchev, it generated tremendous excitement. I asked my cousin Alan, who spoke Russian, to teach me a sentence that I might say to the premier. For weeks I practiced "*Zdravstvuyte, kak vy pozhivaete?*" ("Hello, how are you?") However, at the conclusion of our dancing sequences, there was no hope of meeting the premier. He was busy with Shirley MacLaine, Juliet Prowse, Frank Sinatra, etc. But behind Khrushchev was his wife, Nina Petrovna. I made my way to her, curtsied and uttered my Russian greeting. She took my hand and spoke animatedly in her native tongue. I asked a Secret Service man what she said. "She complimented you on your energy and how well you dance," he related. "She was especially excited so far from home to find dancing in an American film a lovely Russian dancer."

BARBARA DEKOVNER-MAYER
ENCINO, CALIFORNIA

ATLAS LENDS A HAND

THE ARTICLE about Charles Atlas ["Muscle Man"] brought to mind fond memories of summers at Point Lookout, Long Island, where my family had a summer home and Atlas was a neighbor. Every summer I ran an athletic program with swimming and running races that included children 6 and older. Atlas assisted me in distributing medals and prizes to the winners. Looking over my archival photographs, I found a picture of myself, Mr. Atlas and a group of youngsters (below). He was not only a great neighbor, he was wonderful with the children.

JAMES NUGENT
SOUTHAMPTON, NEW YORK

Atlas (shirtless, 1955) helped Nugent (far left) with his program for children.

THE CAHABA'S MURKY PAST

"RIVER OF RICHES" caught my eye because my grandfather, John Burwell Forbes, knew the Cahaba River all too well. In 1864, John was captured by Southern troops. He was one of several thousand Union soldiers sent to Cahaba Prison, located at the confluence of the Alabama and Cahaba rivers. It has been said that when the rivers flooded, the water on the floor (where prisoners slept) rose up to four feet. Grandfather told his children of clinging for several days to whatever was not washed away and of living in his sodden uniform until it dried on his body. When he was released, he weighed barely 100 pounds and never fully recovered.

VERNA FORBES WILLSON
MOGDEN, UTAH

ANOTHER SCORE FOR GALILEO

RECENT findings suggest that Galileo ["Galileo's Vision"] may have been the first to observe Neptune, 234 years before it was discovered to be a planet. Planets move through the sky relative to the stars. In 1613, as Galileo plotted the moons of Jupiter and surrounding areas in his notebooks, he noted that the "star" we know as Neptune appeared to have moved relative to a nearby star.

ARTHUR HAAPOJA
MOUNT PROSPECT, ILLINOIS

CORRECTIONS:

"Muscle Man" misstated Charles Atlas' nickname—it was Angie—and the first name of the co-author of *Yours in Perfect Manhood*. He is Charles Gaines.

Please send letters to **LettersEd@si.edu** or to **Letters, Smithsonian, MRC 513, P.O. Box 37012, Washington, D.C. 20013.** Include a telephone number and address. Letters may be edited for clarity or space. Because of the high volume of mail we receive, we cannot respond to all letters. Send queries about the Smithsonian Institution to info@si.edu or to VIARC, Public Inquiry Mail Service, P.O. Box 37012, Washington, D.C. 20013.

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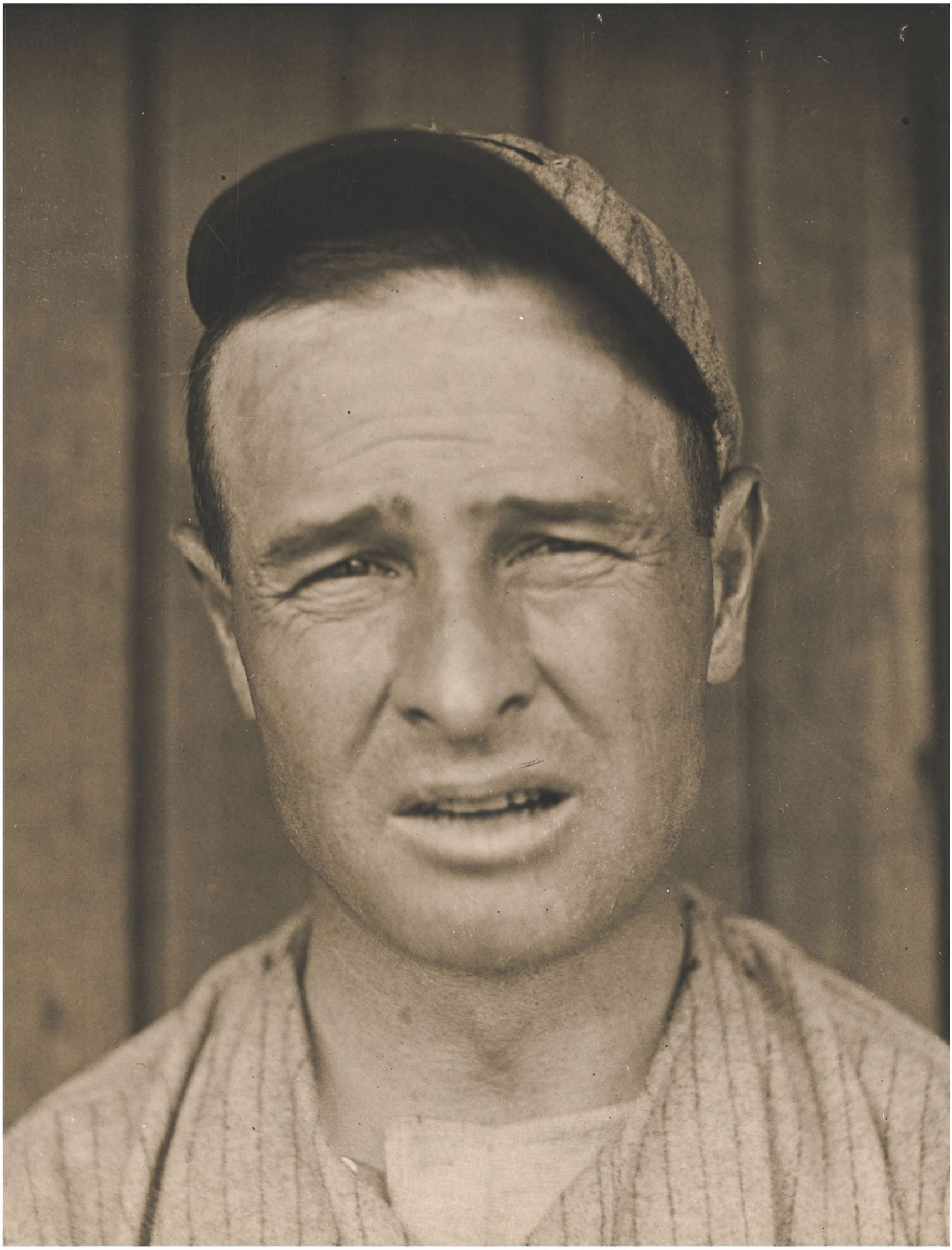


Double Play

Baseball's Tinker, Evers and Chance were celebrated in verse—as well as in Paul Thompson's portraits **BY HARRY KATZ**

FORGET BUBBLE GUM; the first collectible baseball cards came with cigarettes. The cards transformed the game, making household names of its greatest players. In the first decade of the 20th century, baseball's biggest draws included three Chicago Cub infielders who would become linked in legend: Tinker, Evers and Chance. That melodic triplet echoes down the corridors of the Hall of Fame, a box-score cadence whispering to those straining for the sounds of summers past. We can't get back to Chicago's West Side Grounds in October 1908 to see these three help the Cubs defeat the Detroit Tigers on their way to winning the World Series, but we can glimpse their era and their singular faces in baseball cards of the period, when the sport and American commerce intersected.

American tobacco companies began issuing celebrity cards with cigarette packs to boost sales in the 1880s. The first wave included black-and-white studio photographs of awkwardly posed ballplayers reaching for or swinging at a baseball hanging from an often visible string. Other cards, called chromolithographs, were printed in color. They usually bore legends identifying the players, their positions and their teams.

After 1900, as color printing techniques improved, cards became more realistic. About 1909, the American Tobacco Company, a holding consortium for the Big Tobacco lobby, issued a now-coveted series of cards bearing white borders. (A card from this series featuring Honus Wagner, the great Pittsburgh Pirates shortstop, routinely fetches seven figures.) In 1911, American Tobacco followed that series with one bordered in gold leaf. Called "gold borders," these were among the first to include the players' batting and pitching statistics on the cards' other side.

First baseman Frank Chance was known as "the Peerless Leader."

The gold borders sported another enhancement—portraits based on a remarkable series of contemplative close-ups by a New York City-based freelance photographer named Paul Thompson. Thompson, who built his reputation and his studio on a sitting with Mark Twain, would hire others to take pictures for him, but the gold-border portraits are attributed to him because they alone are copyrighted under his name.

Thompson produced the photographs before the 1911 season, taking head shots of the players against rough wooden backdrops at New York's ballparks. With a shallow depth of field and an unsentimental lens, he brought out in sharp relief the players' leathery faces and steel-eyed stares, capturing their pride, their toughness and the effects of extended exposure in the field. The rough dignity of his portraits survived the translation into color prints on cardboard.

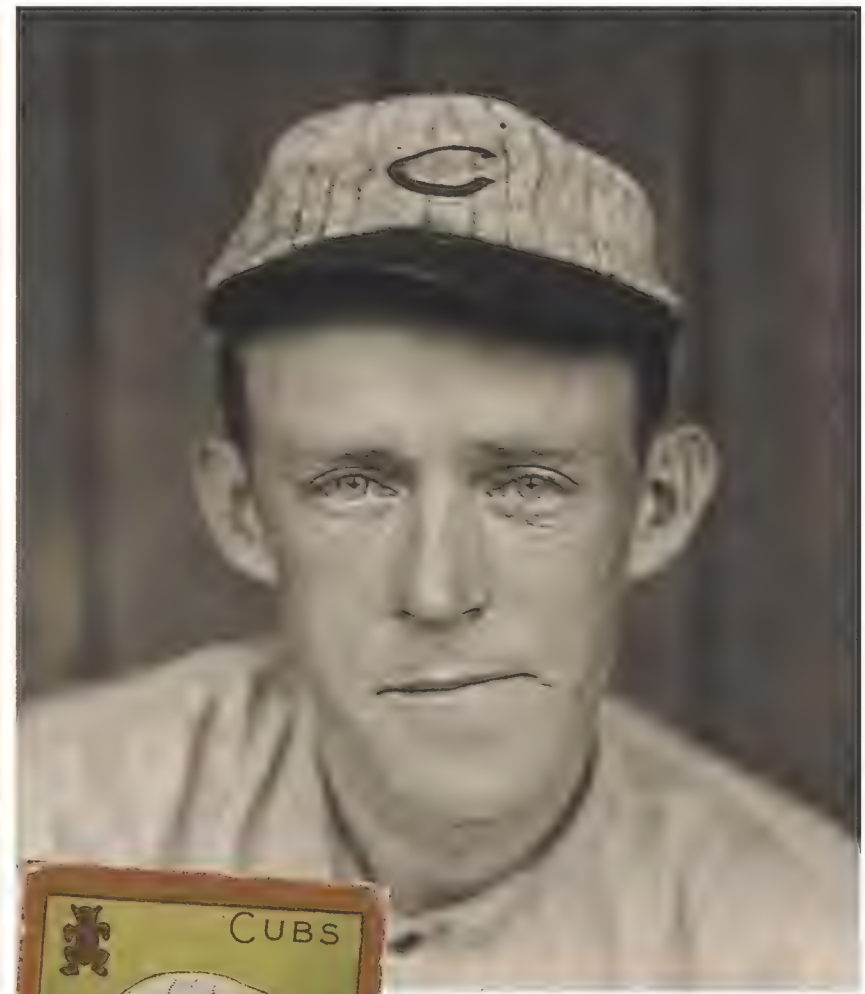
Joe Tinker, Johnny Evers and Frank Chance were already stars when Thompson caught up with them. Tinker, a paperhanger's son from Muscotah, Kansas, had joined the Cubs in 1902, the same year as Evers, who had worked in a collar factory in Troy, New York, while playing for a minor-league team. Chance, the son of a banker in Fresno, California, first appeared on the club's roster in 1898, as a catcher. But as the team was rebuilt in 1902, manager Frank Selee put Tinker at shortstop, with Evers at second and Chance at first. Chance replaced Selee as player-manager in mid-1905. He would become known as "the Peerless Leader."

The trio anchored one of the best infields in the game during a decade of Cubs dominance (four National League pennants and two World Series championships). But they didn't always get along; Tinker and Evers came to blows before a game in September 1905 and stopped speaking to each other for years—even

ALL PHOTOS: LIBRARY OF CONGRESS

Tinker and Evers came to blows before a game in 1905 and stopped speaking to each other for years.

Joe Tinker, the shortstop, hit softly but carried a big glove.



Johnny Evers, at second, was called "the Crab" for his range.

as they continued to demand the best baseball from one another. Although they never led the league in double plays, Franklin Pierce Adams of the *New York Evening Mail* gave that impression in the opening lines of his oft-quoted doggerel:

These are the saddest of
possible words:
"Tinker to Evers to Chance."
Trio of bear cubs, and fleeter than birds,
Tinker and Evers and Chance.

THE GOLD-BORDER CARDS based on Thompson's portraits appeared in 1911—just as the Cubs had begun to falter. By 1913, Tinker had been traded to Cincinnati, Evers had replaced Chance as the Cubs' manager and Chance had left to manage the Yankees. The former first baseman died 11 years later of heart failure stemming from influenza and bronchial asthma; he was 47. Evers died of a cerebral hemorrhage in 1947, at age 65; Tinker expired the next year, on his 68th birthday, of respiratory difficulties.

The trio were inducted into baseball's Hall of Fame in 1946, a selection that is still debated. Bill James, the baseball historian and statistician, has argued both sides of the issue. He once contended that the players' individual statistics were not Hall-worthy; later, he concluded that the whole of their accomplishments mattered more, writing, "It is impossible to avoid the conclusion that [the 1904-13 Cubs] won more games with infield defense than any other team in the history of baseball."

Photographer Thompson left behind a more slender record: even such basic biographical information as the dates of his birth and death is hard to establish. But some two dozen of his player portraits survive in the Library of Congress, bringing to life the subjects' determination, their enduring passion for a physical game and the ravages of a lifestyle that predated the luxury travel, sophisticated equipment and personal trainers of today. The gold-border cards that followed created heroes of banker's and paperhanger's sons alike, filling ballparks and selling cigarettes. The bubble gum came later.

HARRY KATZ *is the principal author of* Baseball Americana: Treasures from the Library of Congress. *He was head curator of the library's Prints and Photographs Division from 2000 to 2004.*

See more vintage baseball cards of famous firsts at Smithsonian.com/baseball

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WILD THINGS

LIFE AS WE KNOW IT

BY AMANDA BENSEN, ABBY CALLARD, T.A. FRAIL, ASHLEY LUTHERN AND SARAH ZIELINSKI

STIRRING UP THE OCEAN

Working in Palau, California Institute of Technology bioengineers found that dye poured in the sea traveled some distance after jellyfish swam through it. The data suggest that the movements of marine creatures play a larger role in "ocean mixing" than previously believed—as great as winds and tides. Mixing can affect water temperature and the movement of nutrients in the ocean.

FIRE POWER

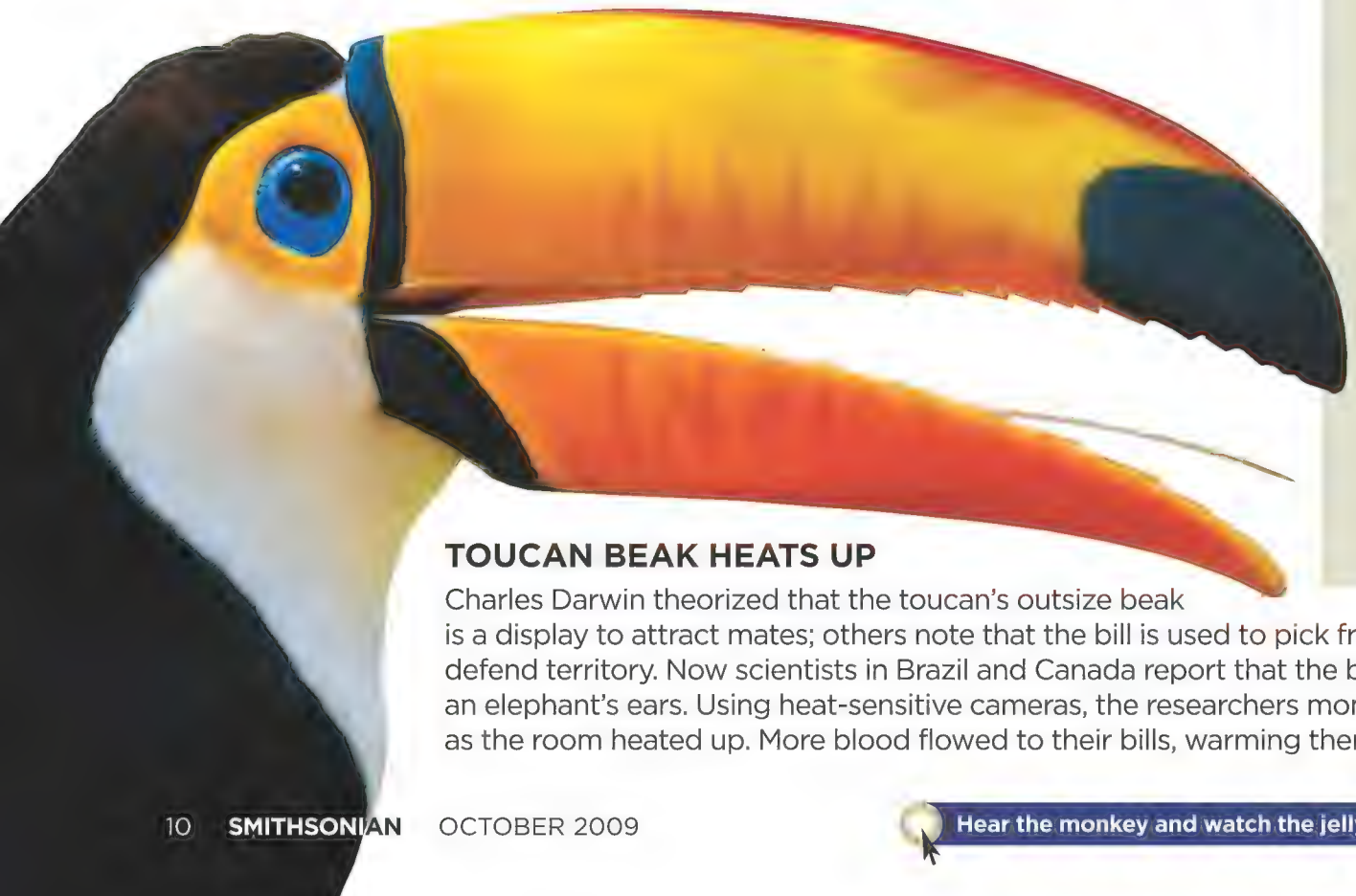
People used fire to prepare stone tools as many as 164,000 years ago, according to a new study in *Science*. That's more than 125,000 years earlier than previous evidence (from Europe) had placed tool firing, which makes stones easier to flake. Chemical and physical analysis of tool remains found in South Africa shows the technique was already common there 72,000 years ago.

AN ORCHID'S DECEPTIVE PERFUME

Why would hornets pounce on an orchid that has no nectar? By mistake, say researchers working on China's Hainan Island. They found that *Dendrobium sinense* flowers produce a chemical that mimics alarm pheromones emitted by honeybees. Hornets, which prey on honeybees, smell the fragrance, attack the orchids—and inadvertently pollinate them.

Observed

NAME: The tufted capuchin monkey (*Cebus apella nigritus*), a fruit-eating primate from South America.
LOOK OUT: Capuchins, which live in groups of 7 to 30, peep and hiccup to alert group members to feline or serpentine predators.
LOOK AWAY: It's now known that capuchins issue false alarms, peeping or hiccuping in the absence of cats or snakes—but in the presence of food.
LOOK AGAIN: The alarms scare other group members away from food sources, says Brandon Wheeler of Stony Brook University. If the calls are intentional, he says, they would be the first "tactical deceptions" seen in non-human primates.



TOUCAN BEAK HEATS UP

Charles Darwin theorized that the toucan's outsize beak is a display to attract mates; others note that the bill is used to pick fruit, rob eggs from nests or defend territory. Now scientists in Brazil and Canada report that the beak also cools the bird, like an elephant's ears. Using heat-sensitive cameras, the researchers monitored toco toucans in a lab as the room heated up. More blood flowed to their bills, warming them and dissipating heat.

Hear the monkey and watch the jellyfish at Smithsonian.com/WildThings

TIM LAMAN / NATIONAL GEOGRAPHIC STOCK; KYLE BROWN / SOUTH AFRICAN COAST PALEOCLIMATE, PALEOENVIRONMENT, PALEOECOLOGY, PALEOANTHROPOLOGY PROJECT (SACP4); BRANDON C. WHEELER; DR. SONG; FRANS LANTING

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YOUR KIND OF TOWN

BY MARY CAPERTON MORTON

STRASBURG, PENNSYLVANIA

WHEN I WAS TWELVE I BOUGHT A PONY complete with cart and harness at a farm auction. An Amishman I knew gave me a driving lesson on the spot, told me to stick to back roads and sent me home at the reins. I named my little red mare Saturday. Once, in town, Saturday untied herself from a hitching post and set off for home. An Amishman who recognized my rig and managed to catch her said she'd been following the rules of the road "like a proper pulling horse." To outsiders, the Amish may seem stuck in time, but their ways keep alive many of the timeless things we wish we had kept: a sense of place, community, an intimacy with the earth. Their placid buggies travel on steel-rimmed wheels, reducing their communities to the distance a horse can trot in a day.

Submit a **Your Kind of Town** story or photograph and find others at Smithsonian.com/yourkindoftown

PHOTO CONTEST

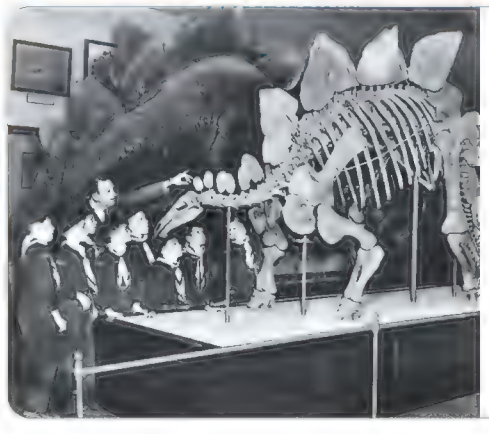
"With the various shades of red contrasted against his skin and beard, it was the perfect frame for a face with so much character."

—Adam Vaught, Buenos Aires, Argentina, on his photograph of an ascetic at a temple in Guwahati, India

SHARK AID

"I'm glad we're finally protecting the sharks from us. Sharks always get a bad rap. I've been bitten by a shark before, and I don't blame the shark; I blame me."

—Erica Grebeck, Arlington, Texas, on "Stopping Sharks by Blasting Their Senses" Smithsonian.com/sharkrepellent



CAPTION CONTEST

SCOUTOSAURS

What's happening in this photograph taken sometime in the 1950s at the Smithsonian's National Museum of Natural History? Your guess is (nearly) as good as ours. Please submit your caption by October 12, 2009, at Smithsonian.com/caption

ADAM VAUGHT; RANDY FARIS / PHOTOLIBRARY; GAAS / AP IMAGES; SMITHSONIAN INSTITUTION ARCHIVES

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DIGS

Some 80 million "lost" pages include records of people (below) and police assassination orders.

Paper Trail

In Guatemala, a chance discovery of police archives may reveal the fate of tens of thousands of people who disappeared in that country's civil war

BY JULIAN SMITH

RUSTING CARS are piled outside the gray building in a run-down section of Guatemala City. Inside, naked light bulbs reveal bare cinder-block walls, stained concrete floors, desks and filing cabinets. Above all there is the musty odor of decaying paper. Rooms brim with head-high heaps of papers, some bundled with plastic string, others mixed with books, photographs, videotapes and computer disks—all told, nearly five linear miles of documents.

DANIEL LECLAIR / REUTERS / CORBIS; ANN HARRISON / HUMAN RIGHTS DATA ANALYSIS GROUP

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"In this country, it has become dangerous to remember," says the director of the archive project.

This is the archive of the former Guatemalan National Police, implicated in the kidnapping, torture and murder of tens of thousands of people during the country's 36-year civil war, which ended in 1996. For years human rights advocates and others have sought to hold police and government officials responsible for the atrocities, but very few perpetrators have been brought to trial because of a lack of hard evidence and a weak judicial system. Then, in July 2005, an explosion near the police compound prompted officials to inspect surrounding buildings looking for unexploded bombs left from the war. While investigating an abandoned munitions depot, they found it stuffed with police records.

Human rights investigators suspected that incriminating evidence was scattered throughout the piles, which included such minutiae as parking tickets and pay stubs. Some documents were stored in cabinets labeled "assassins," "disappeared" and "special cases." But searching the estimated 80 million pages of documents one by one would take at least 15 years, experts said, and virtually no one in Guatemala was equipped to take on the task of sizing up what the trove actually held.

After the archives were discovered in an abandoned munitions depot (top), investigators sought the assistance of human rights expert Patrick Ball (above).

That's when investigators asked Benetech for help. Founded in 2000 in Palo Alto, California, with the slogan "Technology Serving Humanity," the nonprofit organization has developed database software and statistical analysis techniques that have assisted activists from Sri Lanka to Sierra Leone. According to Patrick Ball, the organization's chief scientist and director of its human rights program, the Guatemalan archives presented a unique challenge that was "longer-term, more scientifically complex and more politically sensitive" than anything the organization had done before.

From 1960 to 1996, Guatemala's civil war pitted left-wing guerrilla groups supported by Communist countries, including Cuba, against a succession of conservative governments backed by the United States. A 1999 report by the United Nations-sponsored Guatemalan Commission for Historical Clarification—whose mandate was to investigate the numerous human rights violations perpetrated by both sides—estimated that 200,000 people were killed or disappeared. In rural areas, the military fought insurgents and indigenous Mayan communities who sometimes harbored them. In the cities, the National Police targeted academics and activists for kidnapping, torture and execution.

Although the army and the National Police were two separate entities, the distinction was largely superficial. Many police officers were former soldiers. One police official told the Commission for Historical Clarification that the National Police took orders from military intelligence and had a reputation for being "dirtier" than the army. The National Police was disbanded as a condition of the 1996 Guatemalan peace accords and replaced with the National Civilian Police.

THE ARCHIVE BUILDING IS a very different place depending on which door one enters. One leads to the rooms filled with musty paper. Another opens on to the hum of fans and the clack of keyboards from workrooms and offices. Young workers in matching tan coats stride down brightly lit hallways, where row after row of metal shelves hold hundreds of neatly labeled file boxes.

Benetech's first task was to get a sense of what the archive held. Guided by randomized computer instructions, workers withdrew sample documents: Take a paper from such and such a room, that stack, so many inches or feet deep. The more samples that are collected, the more accurately the researchers can estimate what the entire archive holds. Following this method, the investigators avoid charges from critics that they are selecting only incriminating documents.

In one room, three women in hairnets, gloves and painters' breathing masks are bent over a table. One brushes a typewritten document yellowed with age. After each document is cleaned, it is digitally scanned and filed. The Guatemalan researchers place all the documents into storage. Some documents—the ones randomly selected by Benetech—will be entered into a database called Martus, from the Greek word for "witness."

ANN HARRISON / HUMAN RIGHTS DATA ANALYSIS GROUP (2)

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There is "no doubt that the police participated in disappearances and assassinations," says Villagran.

Martus is offered free by Benetech online to human rights groups, and since 2003 more than 1,000 people from more than 60 countries have downloaded it from the group's Web site (www.martus.org). To safeguard the information stored in Martus, the database is encrypted and backed up onto secure computer servers maintained by partner groups worldwide.

Working with an annual budget of $2 million donated by European countries, researchers and technicians have digitized eight million documents from the archive, and cleaned and organized another four million. Based on the evidence collected so far, there is "no doubt that the police participated in disappearances and assassinations," says Carla Villagran, a former adviser to the Project to Recover the Historic Archives of the National Police. In some cases the information is explicit; in others, conclusions are based on what the documents don't contain. For example, a name that disappears from an official list of prisoners might mean the person was executed.

Clockwise, from top left: Wearing masks and gloves, workers clean, digitally scan and file the documents, including thousands of identification cards and fingerprints.

As the details of daily reports and operational orders accumulate in the Martus database, a larger picture has emerged, allowing investigators to understand how the National Police functioned as an organization. "We're asking, 'What's going on here?'" says Ball. Did the police get their orders directly from military intelligence or senior officials within the police force? Did mid-level officials give the orders without consulting superiors? Or did individual police officers commit these acts on their own initiative?

Ball insists that Benetech's job is to "clarify history," not to dictate policy. Guatemalan President Álvaro Colom showed his support with a visit to the archive last year. Still, "in this country, it has become dangerous to remember," says Gustavo Meoño, director of the archive project. There has been at least one attempt to firebomb the archive. Not everyone is eager to dig up the recent past, especially police—some still serving on active duty—who could be implicated in crimes. But at the very least, the researchers hope to give closure to victims' relatives and survivors. "If you have an official document that proves what you've been saying is true," Villagran says, "it's more difficult for anyone to say that you're lying about what happened to you, your family and the ones you loved." Villagran's voice cracks as she tells how her husband was kidnapped and then disappeared during the war.

This past March, Sergio Morales, the Guatemalan government's human rights ombudsman, released the first official report on the police archives project, "El Derecho a Saber" ("The Right to Know"). Though many human rights watchers had expected sweeping revelations, the 262-page report mostly just described the archive. Ball was among those disappointed, though he hopes a second report currently under development will include more details.

Yet the report did cite one specific case—that of Edgar Fernando García, a student who was shot in 1984, taken to a police hospital and never heard from again. (García's widow is now a congresswoman.) Based on evidence recovered from the archive, two former members of a police unit linked to death squads were arrested, and arrest orders have been issued for two other suspects. It was an alarming precedent for those who still could be implicated: the day after the report's release, Morales' wife was kidnapped and tortured. "They are using violence to spread fear," Morales told newspapers.

The question about what to do with future findings remains open. "Prosecutions are a great way of creating moral closure—I've participated in many," says Ball. "But they aren't what will change a country." In his view, understanding how the National Police went bad and preventing it from happening again—"that's real improvement."

The work at the archive is expected to continue. Villagran hopes to have another 12 million documents digitized over the next five years. Meanwhile, the databases have been made available to Guatemalan citizens and human rights groups everywhere, says Ball. "Now it's the world's job to dig through the material and make sense of it."

JULIAN SMITH's *book* Chasing the Leopard *will be published in summer 2010.*

EITAN ABRAMOVICH / AFP / GETTY IMAGES; ANN HARRISON / HUMAN RIGHTS DATA ANALYSIS GROUP (2)

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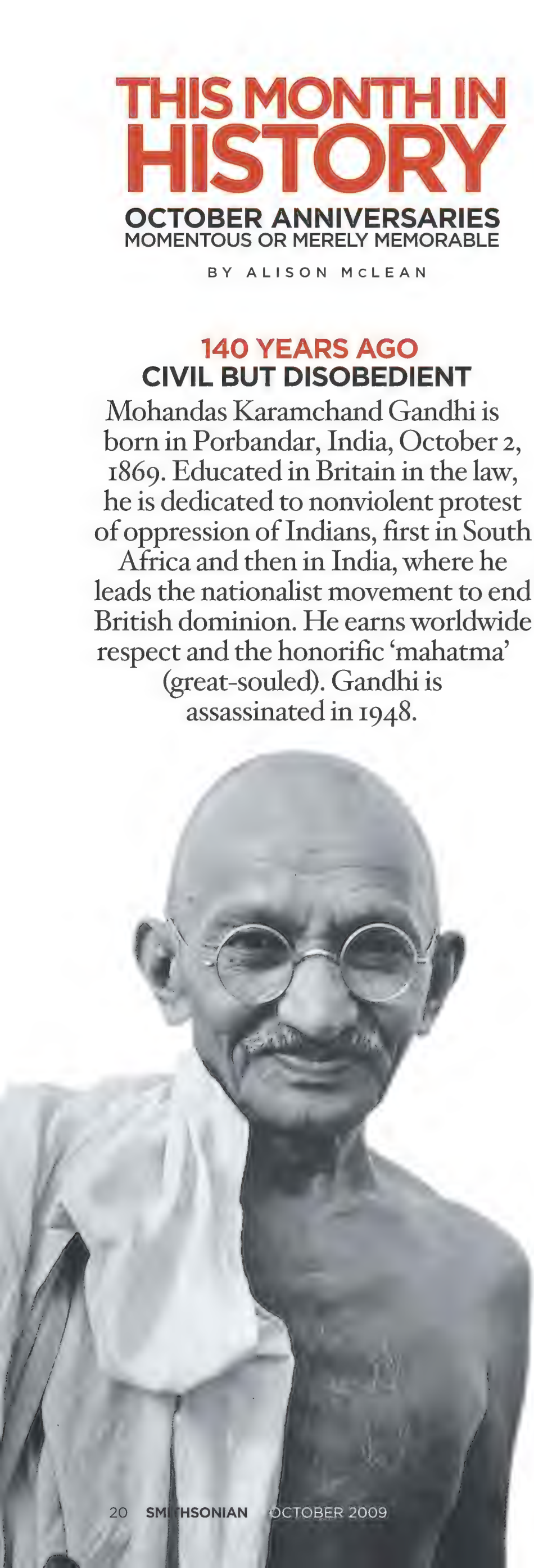
THIS MONTH IN HISTORY

OCTOBER ANNIVERSARIES
MOMENTOUS OR MERELY MEMORABLE

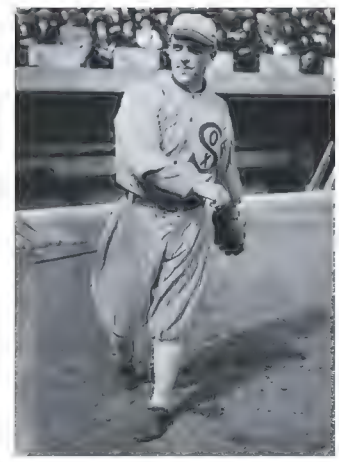
BY ALISON McLEAN

140 YEARS AGO
CIVIL BUT DISOBEDIENT

Mohandas Karamchand Gandhi is born in Porbandar, India, October 2, 1869. Educated in Britain in the law, he is dedicated to nonviolent protest of oppression of Indians, first in South Africa and then in India, where he leads the nationalist movement to end British dominion. He earns worldwide respect and the honorific 'mahatma' (great-souled). Gandhi is assassinated in 1948.



90 YEARS AGO
BLACK AND BLUE

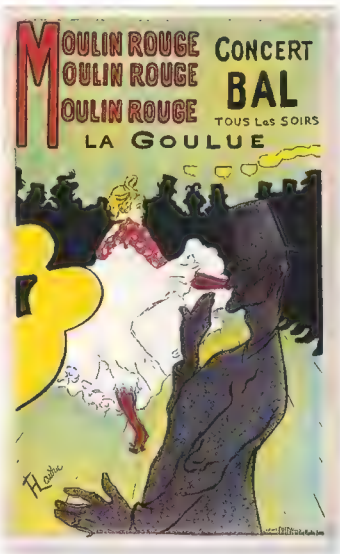


Rumors of a fix fly when the favored Chicago White Sox lose the 1919 World Series to the Cincinnati Reds, three games to five. An investigation in 1920 charges that members of the "Black Sox," as the Chicago team is known—for the color of its unwashed laundry or its players' souls—conspired with gamblers to throw games for cash. Pitcher Eddie Cicotte (right) admits to taking $10,000 and tossing balls "a baby could have hit," but later recants and, with the seven other players tried, is acquitted. But all eight are banned from baseball for life.

220 YEARS AGO UNBALANCED RULING

New York statesman John Jay, a former president of the Continental Congress, is sworn in as the first chief justice of the United States, October 19, 1789. Jay and the Supreme Court's five other justices must "ride circuit"—travel to the lower district courts around the country—to hear cases. Their 1793 decision in Chisholm v. Georgia affirming federal judiciary authority over the states proves so unpopular, Congress enacts the 11th Amendment to overrule it.

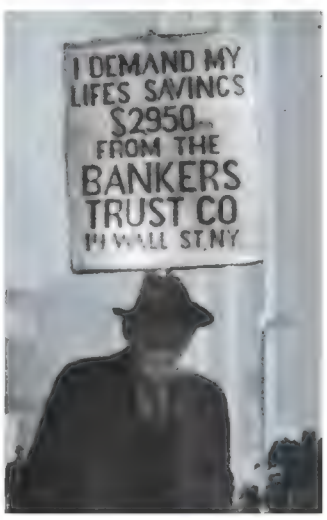
120 YEARS AGO BOTTOMS UP



The Moulin Rouge dance hall opens its doors in Paris on October 6, 1889, under the red windmill that gives it its name. It quickly attracts "smart people . . . penniless noblemen and wealthy villains," a reviewer notes, for a close-up view of the new and uninhibitedly decadent dance the cancan. One star kicker is La Goulue, whom a 27-year-old Toulouse-Lautrec depicts on the 1891 poster (right) that makes his name as an avant-garde artist.

80 YEARS AGO WHAT GOES DOWN. . . ?

The 1920s investment boom goes bust when a record number of shares are traded on Wall Street in October 1929—16.4 million on the 29th alone—evaporating $30 billion from the stock market's value. As overleveraged investors crash, consumer spending declines and a tariff reduces foreign markets for U.S. goods. Unemployment rises and the country sinks into the Great Depression. By 1933, some 9,000 banks fail, taking uninsured depositors with them. Today the Federal Deposit Insurance Corporation, begun in 1933, insures deposits up to $250,000.



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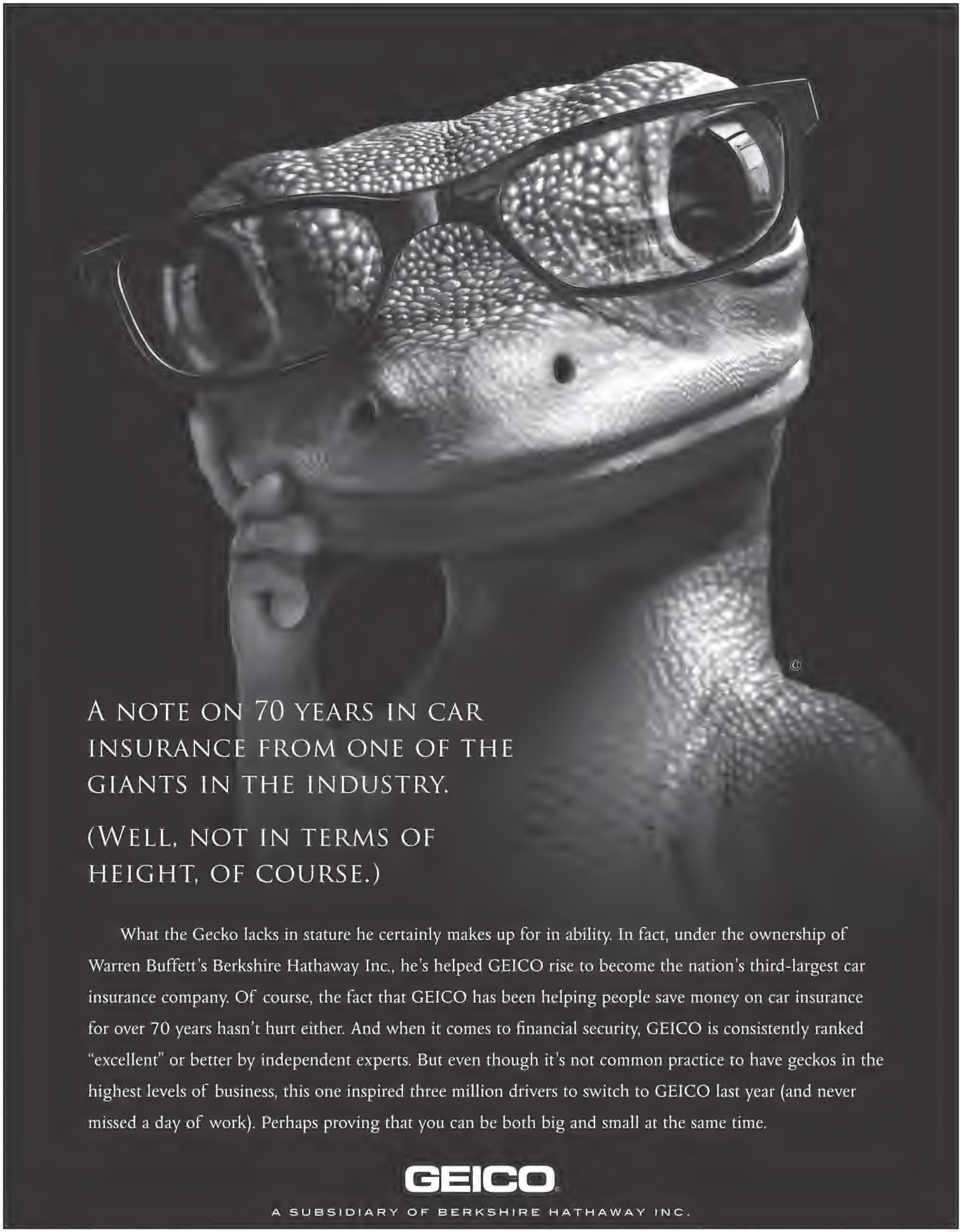
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A NOTE ON 70 YEARS IN CAR INSURANCE FROM ONE OF THE GIANTS IN THE INDUSTRY.
(WELL, NOT IN TERMS OF HEIGHT, OF COURSE.)
What the Gecko lacks in stature he certainly makes up for in ability. In fact, under the ownership of Warren Buffett's Berkshire Hathaway Inc., he's helped GEICO rise to become the nation's third-largest car insurance company. Of course, the fact that GEICO has been helping people save money on car insurance for over 70 years hasn't hurt either. And when it comes to financial security, GEICO is consistently ranked "excellent" or better by independent experts. But even though it's not common practice to have geckos in the highest levels of business, this one inspired three million drivers to switch to GEICO last year (and never missed a day of work). Perhaps proving that you can be both big and small at the same time.
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Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

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Q&A: Mark Newport p. 28
What's Up p. 30

STEPHEN VOSS

A STEADY HAND

XIANGMEI GU WIELDS PAINTBRUSHES AND TWEEZERS WITH THE DELICACY OF A SURGEON TO RESTORE CHINESE PAINTINGS TO THEIR FORMER GLORY

PAGE 26

Washing a painting is the first step in restoring it. "Until you stop working, you never stop learning," says Gu.

FROM THE CASTLE

Mind-Meld

G. WAYNE CLOUGH

GRATEFUL DEAD FANS may remember the lyrics, "Dark star crashes, pouring its light into ashes." Mickey Hart, a drummer for the Dead, is still thinking about the cosmos, and he recently contacted Smithsonian Under Secretary Richard Kurin to arrange a discussion with distinguished astrophysicist Margaret Geller of the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, science historian David DeVorkin and ethnomusicologist Atesh Sonneborn; I also participated. Our question: How might Hart perceive and record the "music" of the universe? Can lightwaves reaching Earth after traveling hundreds of millions of light-years speak to our creative, as well as our scientific, selves? Geller answered yes, and offered ideas for how Hart might translate what we observe into music. She suggested that a musician she knows—a person who also has superb computer skills—could help Hart convert strings of numbers representing star formation, gamma ray bursts, black hole binaries and other astrophysical phenomena into music. In an e-mail, Hart reacted to his Smithsonian visit: "Exciting. . . . As Soupy Sales would say, 'My brains are falling out.'"

The Grateful Dead's Hart: Still thinking about the cosmos

Such intersections of science and the arts occur frequently at the Smithsonian. At a recent materials science workshop, Julian Raby, the director of our Freer and Sackler Galleries, described the ongoing collaborative research being conducted on ancient Chinese metalwork and ceramics by the Freer and Sackler with Chicago's Field Museum and China's Shaanxi Research Institute for Archaeology. And at the National Museum of Cambodia in Phnom Penh, Freer and Sackler conservators have created a lab to treat the museum's collection of bronzes; a U.S. exhibition of some of them is being planned. The Freer and Sackler Galleries have also partnered with our Museum Conservation Institute (MCI) to analyze the paint on sixth-century Buddhist sculptures. Currently Freer and Sackler staff are using radiography to study Japanese writing boxes. Used by aristocrats between 1392 and 1868, these intricately decorated lacquer boxes all stored calligraphy tools, but they vary in construction. Is it because of their function or their date? Radiography may help answer the question.

With the National Museum of Natural History, the Conservation Institute is also helping preserve, in their natural settings, Mongolia's deer stones—3,000-year-old plinths carved with elaborate flying "spirit deer." MCI specialists are also capturing pictorial information about these monuments with 3-D laser scanning. And Conservation Institute director Robert Koestler is helping investigate rapidly growing soil mold that threatens one of the world's great treasures—the Paleolithic cave at Lascaux, France, and its nearly 2,000 animal images painted 16,000 years ago. Science and the arts are unusual partners at most places, but not at the Smithsonian.

G. WAYNE CLOUGH *is Secretary of the Smithsonian Institution.*

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G. Wayne Clough

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TRAILBLAZER

XIANGMEI GU ONCE LABORED ON A FARM NEAR SHANGHAI. TODAY, SHE IS THE SMITHSONIAN'S FIRST AND ONLY CONSERVATOR OF CHINESE PAINTINGS

XIANGMEI GU approaches a mid-20th-century Chinese painting with a pair of pointed tweezers. Her task is to remove the last layer of deteriorated paper that backs the painting *Lofty Scholar in an Autumn Grove* and to replace it with fresh paper. Delicately, she punctures the sheet, then uses her fingertips to roll the brittle, yellowed fragments into small coils. Gu's staff of three seems to hold its collective breath. As the last snippet is finally removed, the relief is palpable. Later in the day, Gu—the first and only conservator of Chinese paintings at the Freer Gallery of Art and Arthur M. Sackler Gallery—will remount the painting with the help of an American assistant and two Chinese fellows.

The fellows will be staying for only three months—just enough time "to learn and review the basic techniques," Gu says. But, she adds, when it comes to art conservation, "until you stop working, you never stop learning."

Gu, 58, was in her early 20s when her own education in conservation began in 1972. After working for three years on a farm in Nanhui County, near Shanghai, she was chosen that year by the Shanghai Museum for an art scholarship—one of 30 selected from hundreds of candidates. Gu stayed at the Shanghai Museum—as student, apprentice and conservator—for 15 years.

Sitting in her studio on the main level of the Freer Gallery on the National Mall, Gu pulls a photograph from a desk drawer. In it, three students who joined the conservation department at the Shanghai Museum huddle around a teacher. Gu is the second from the left. "I was so young," she says, laughing at her appearance.

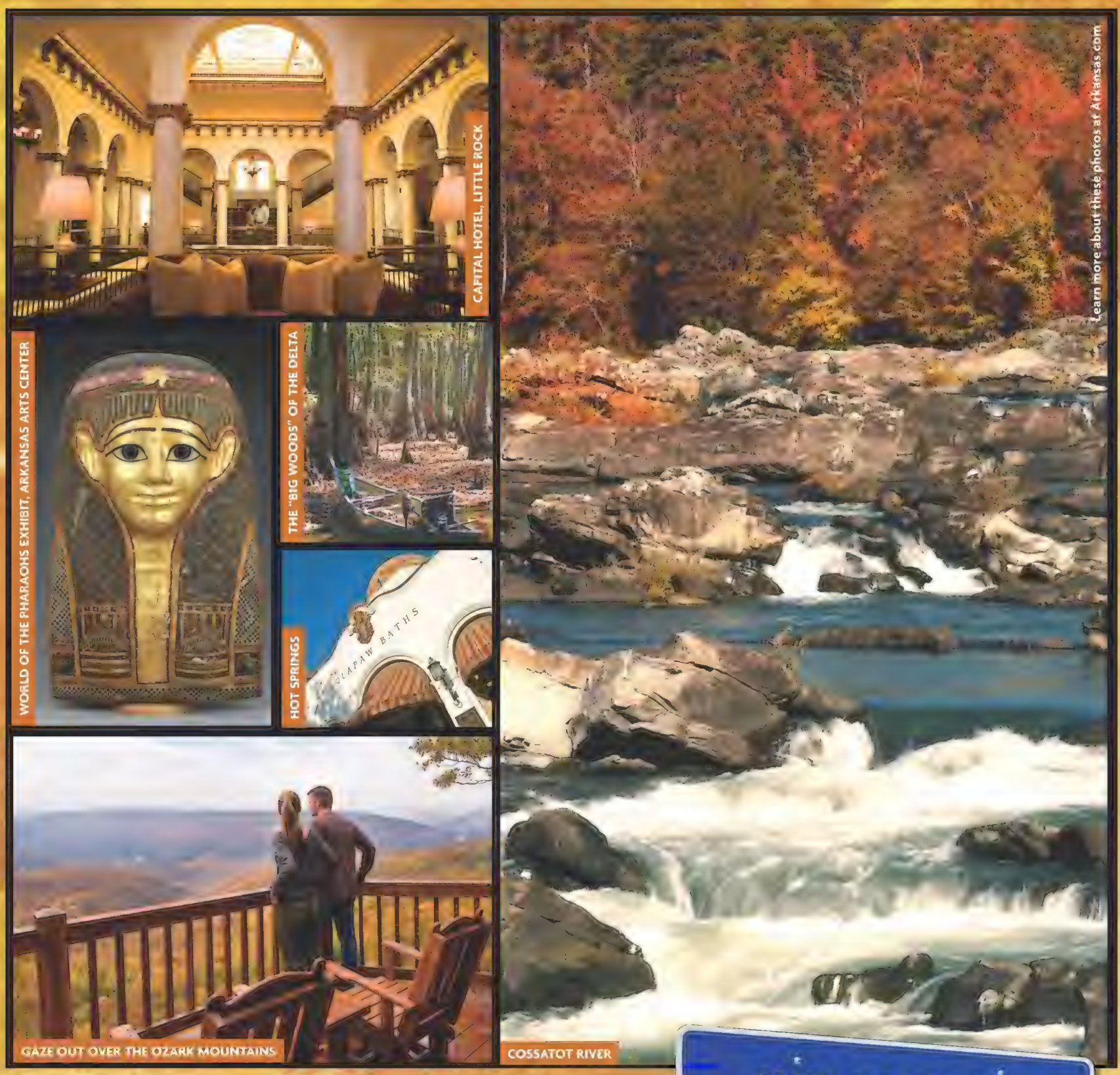
Gu came to the United States in 1987 to join her husband, Jinrui Dai, who was in graduate school at the University of Illinois at Chicago. (Today he is a retired biopharmaceutical chemist. The couple has a daughter, Sheryl Dai.) After working as a conservator at the Art Institute of Chicago, Gu wrote to the Freer's curator of Chinese paintings to ask for a job. It wasn't the usual way to apply for a position at a prestigious museum, she says with a giggle, but "because I'm from China, I don't know anything about America." In any case, it worked. Prior to her arrival at the Freer in 1990, Chinese

CONTINUED ON PAGE 28

Before Gu can remount the painting *Lofty Scholar in an Autumn Grove* (right), she must painstakingly remove layers of deteriorated backing paper.

SACKLER GALLERY, SI

BE ENTHRALLED by AMAZING FALL FOLIAGE and FABULOUS PHARAOHS.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WORLD OF THE PHARAOHS EXHIBIT, ARKANSAS ARTS CENTER
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Q&A

Flashy capes and skin-tight garments are the usual accouterments of comic book superheroes. But artist **MARK NEWPORT** has some fun with these larger-than-life characters with his soft, hand-knit costumes, which are on view through January 3 at the Renwick Craft Invitational. He spoke with the magazine's Jordan Steffen.

HOW DID YOU GET INTERESTED IN SUPERHEROES?

When I was a kid I would draw and paint stuff. Sometimes I would copy images out of comic books.

SUPERHEROES ARE SYMBOLS OF STRENGTH, BUT YOUR COSTUMES ARE KNITTED.

Knitting is a very slow technique. That contradicts the idea of a superhero as a man or woman of action. Also there's a practical reason: a knit garment stretches more than a woven textile. It's more functional.

WHO TAUGHT YOU HOW TO KNIT?

I learned to knit twice. The first time was when I was a kid and my grandmother taught me. In 2000, I wanted to include knitting in some undergraduate classes I was teaching. My wife is a knitter. She gave me a couple books and said, "Here, get to it."

YOU DISPLAY YOUR COSTUMES HANGING LOOSELY, INSTEAD OF ON MANNEQUINS.

Knit costumes stretch and sag. They take on a completely empty look that challenges the image of the big, muscular superhero body. And by displaying the costumes on a hanger, it's like they're in a closet. Anybody can imagine putting on the costumes and taking on that superhero role.

DO YOU HAVE A FAVORITE?

Batman. For the most part, I identify more with the "make-yourself" type of hero as opposed to the ones who have their powers thrust upon them. It mimics the idea of how we can take care of the people around us through mundane, human roles.

Read more of our interview with Mark Newport at Smithsonian.com/newport

TRAILBLAZER CONTINUED FROM PAGE 26

paintings were restored by Japanese conservators, who were more accustomed to working with darker fabrics and more elaborate patterns than those found in traditional Chinese paintings.

Gu's latest project is repairing paintings for two upcoming November exhibits: "Children at Play," at the Freer, and "The Art of China," at the Sackler, which adjoins the Freer. In one 15th-century painting, *A Noble Boy and His Goat*, the pigment is missing and chipped, and creases mar the surface, including one that travels up the goat's belly. "Museum visitors focus on the creases and not on the art," Gu says.

After she takes off the backing (above), Gu saves the brittle fragments in her record books, which date back two decades and line the shelves in her office.

She smoothes out the creases by applying thin strips of paper with paste to the painting's back and tapping them in place with a stiff brush made of palm tree fiber. Where paint is missing, she adds pigment. She sits on a small stool and mixes colors using three rows of 14 paints. When restoring darker shades, she relies on traditional Chinese pigments, which provide a thick, opaque layer; for lighter tones, she uses watercolors, which are more subtle.

Gu appears calm as she works, though she admits she sometimes gets a stomachache before undertaking a really big repair. She has never forgotten the central lesson that she learned from her teacher in Shanghai: If she makes a mistake, the painter can't come back to life to fix it. **ABBY CALLARD**

SAAM; MARK NEWPORT / SAAM; STEPHEN VOSS

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What's Up

UP AND COMING

Through January 6, the Ripley Center displays 15 works by emerging artists, ages 16 to 25, with disabilities. The artists express how their disabilities have motivated them and influenced their lives (left: *Satori*, Niamh Butler, 2008).

IN PLAIN SIGHT

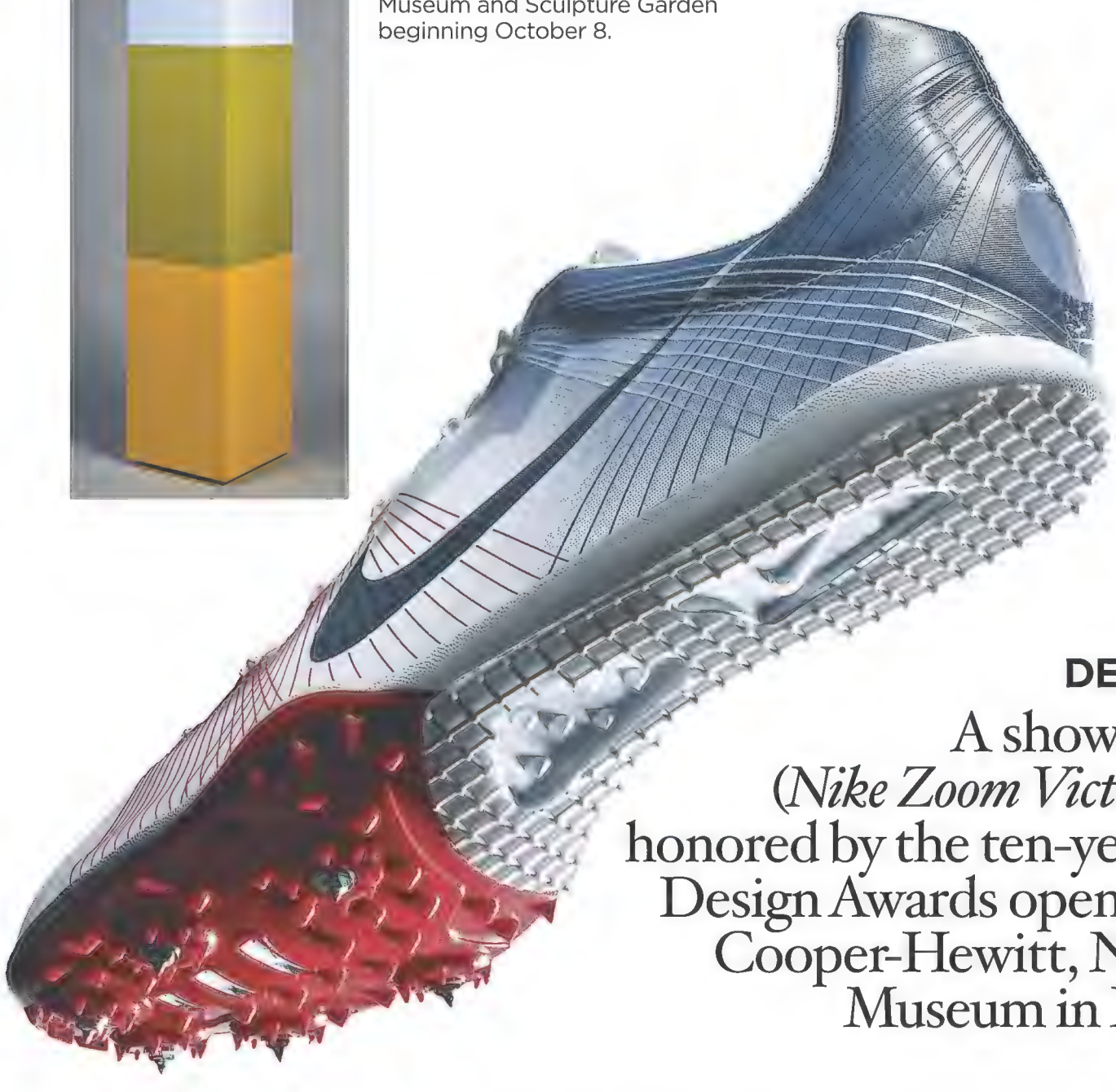
A painter as well as a sculptor, Anne Truitt experimented with perception and color to create exquisite minimalist sculptures (left: *A Wall for Apricots*, 1968). See her works at the Hirshhorn Museum and Sculpture Garden beginning October 8.

SEEK YOUR FORTUNE

Want to know your future? Starting October 24 at the Sackler Gallery, you can gaze upon the *Falnama*, a collection of illustrated manuscripts (left: *Adam and Eve Expelled From Paradise*, mid-16th century) that sultans consulted for omens.

FOR HIRE

The Bracero Program (1942-64) was the largest guest worker agreement in U.S. history. Documents and photographs (above: *Mexican Farm Laborer* by Leonard Nadel, 1956) tell the workers' stories; at American History Museum through January 3.



DESIGNER DECADE

A showcase of winners (*Nike Zoom Victory Spike*, 2007) honored by the ten-year-old National Design Awards opens October 16 at Cooper-Hewitt, National Design Museum in New York City.

ABBY CALLARD

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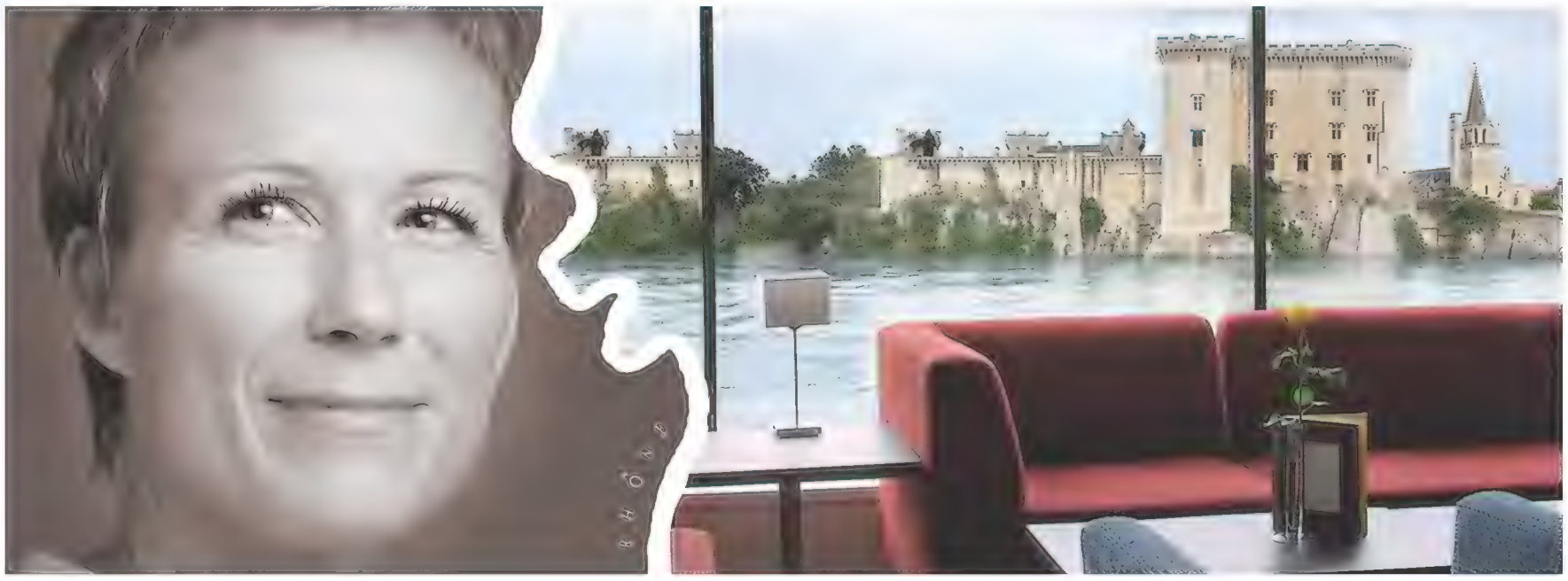

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Smithsonian
OCTOBER 2009 VOLUME 40 NUMBER 7

PRESCRIPTION FOR MURDER

In Southeast Asia, phony antimalaria pills are linked to thousands of deaths. Now an elite team of scientists wielding cutting-edge forensic tools has put some counterfeiters behind bars

BY ANDREW MARSHALL
PHOTOGRAPHS BY JACK PICONE

Many medicines are too costly for Asia's rural poor (Cambodia's Leng Bo with her five children), who unknowingly turn to counterfeits, which are cheaper. The fake drugs may account for 200,000 deaths a year.

In Battambang, Cambodia, a western province full of poor farmers barely managing to grow enough rice to live on, the top government official charged with fighting malaria is Ouk Vichea. His job—contending with as many as 10,000 malaria cases a year in an area twice as large as Delaware—is made even more challenging by ruthless, increasingly sophisticated criminals, whose handiwork Ouk Vichea was about to demonstrate.

Standing in his cluttered lab only a few paces wide in the provincial capital, also called Battambang, he held up a small plastic bag containing two identical blister packs labeled artesunate, a powerful antimalarial. One was authentic. The other? "It's 100 percent flour," he said. "Before, I could tell with my eyes if they were good or bad. Now, it's impossible."

The problem that Ouk Vichea was illustrating is itself a scourge threatening hundreds of thousands of people, a plague that seems all the more cruel because it is brought on by cold, calculated greed. Southeast Asia is awash

in counterfeit medications, none more insidious than those for malaria, a deadly infectious disease that is usually curable if treated early with appropriate drugs. Pharmacies throughout the region are stocked with the fake malaria medicine, which is generally cheaper than the real thing.

Artesunate, developed by Chinese scientists in the 1970s, is a leading antimalaria drug. Its active ingredient, artemisinin, comes from the wormwood plant, which ancient Chinese herbalists prized for its fever-reducing properties. Between 1999 and 2003, medical researchers conducted two surveys in which they randomly purchased artesunate from pharmacies in Cambodia, Myanmar (formerly Burma), Laos, Thailand and Vietnam. The volume of fake pills rose from 38 percent to 53 percent.

"This is a very, very serious criminal act," Nicholas White, a malaria expert at Mahidol University in Bangkok, Thailand, says of the counterfeiting. "You're killing people. It's premeditated, coldblooded murder. And yet we don't think of it like that."

Nobody knows the full scope of the crime, although the World Health Organization (WHO) estimates that counterfeit drugs are associated with up to 20 percent of the one million malaria deaths worldwide each year. Reliable statistics in Southeast Asia are hard to come by, partly because the damage seldom arouses suspicion and because victims tend to be poor people who receive inadequate medical treatment to begin with.

That dimension of the problem was made clear to me by Chem Srey Mao, a 30-year-old farm laborer in Pailin, Cambodia. She said she had been sick with malaria for two weeks before she finally visited the district's main health clinic, a one-story building with a handful of rooms. She had been dosing herself with painkillers so she could work in the fields, sometimes collapsing in the afternoon with fevers and chills. "I needed the money for medicine and food," she said. "I had to work."

Counterfeit antimalarial pills are typically sold in small village drugstores, where owners may lack the expertise to identify fakes.

MAP: GUILBERT GATES

The most afflicted populations live in remote, rural areas and have limited access to health facilities. An estimated 70 percent of malaria patients in Cambodia seek treatment at local village vendors, who don't have the expertise or resources to distinguish real pills from counterfeits.

"The first time they get sick they go to a private clinic or small pharmacy," Ouk Vichea says. "Only when it's severe do they go to the hospital." And then it's often too late.

Compared with what Americans typically pay for drugs, genuine artesunate is cheap in Southeast Asian countries—around $2 for the standard treatment of a dozen pills. But that's still 20 times more expensive than an earlier antimalarial, chloroquine, now seldom used because the malaria parasite has evolved resistance to it. And in Cambodia, where the average per capita income is just $300 a year, the nickels or dimes people save buying counterfeit artesunate pills represent significant savings. "It's the number one fake," says Ouk Vichea.

Counterfeiting is "a relatively high-profit and risk-free venture. Very few people are sent to jail for dealing in fake anti-infectives."

Tablets sold in blister packs are evaluated in the Battambang Provincial Health Department laboratory (below).

Bogus medicines are by no means limited to malaria or Southeast Asia; business is booming in India, Africa and Latin America. The New York City-based Center for Medicine in the Public Interest estimates that the global trade in fake pharmaceuticals—including treatments for malaria, tuberculosis and AIDS—will reach $75 billion a year in 2010. In developing countries, corruption among government officials and police officers, along with weak border controls, allow counterfeiters to ply their trade with relative impunity. Counterfeiting is "a relatively high-profit and risk-free venture," says Paul Newton, a British physician at Mahosot Hospital in Vientiane, Laos. "Very few people are sent to jail for dealing in fake anti-infectives."

When the fake artesunate pills first appeared in Southeast Asia in the late 1990s, they were relatively easy to distinguish. They had odd shapes and their packaging was crudely printed. Even so, Guilin Pharmaceutical, a compa-

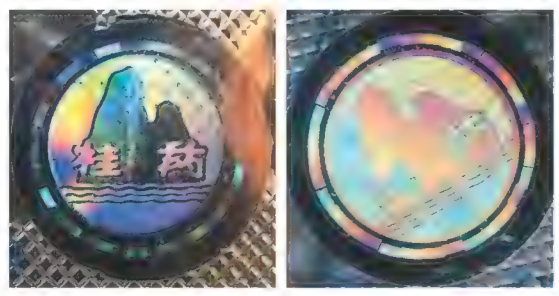
"Before, I could tell with my eyes if they were good or bad," says health official Ouk Vichea (right, with colleague Kho Virak).

Paul Newton (above right, with chemist Michael Green) led the team that found the region where fake pills were being made.

ny based in southern China's Guangxi autonomous region and one of the largest producers of genuine artesunate in Asia, took extra steps to authenticate its medication by adding batch numbers and holograms to the packaging. But the counterfeiters quickly caught on—new and improved fakes appeared with imitation holograms.

Then, in May of 2005, with the counterfeiters gaining ground, a number of physicians, officials, researchers and others gathered at the WHO regional office in Manila. Public health experts agreed to join forces with the International Criminal Police Organization (Interpol). They would try to track down the sources of the bogus artesunate and disrupt the trade. They would launch an investigation like no other, drawing on an extraordinary range of authorities in subjects from holography to pollen grains. They would call it the Jupiter Operation.

Holograms were added to authenticate drug packages (left), but counterfeiters came up with convincing imitations.



PAUL NEWTON ATTENDED that first meeting in Manila, which he recalls was held in an atmosphere of "some desperation." He would coordinate the scientific investigation, which included experts from nine countries. "No one had tried to bring diverse police forces, forensic scientists, doctors and administrators together before," he says.

The goal was to gather enough evidence to halt the illicit trade by putting the counterfeiters behind bars. But first they had to be found. The investigators collected 391 "artesunate" samples from across Southeast Asia and subjected each pill packet to a battery of tests. "We were all working on pieces of a puzzle," says Michael Green, a research chemist at the Centers for Disease Control and Prevention in Atlanta. "When these pieces—chemical, mineralogical, biological, packaging analysis—were compared and assembled, a picture of where many of these counterfeits were coming from began to emerge."

The investigators pored over each package. In some cases, a mere glance was sufficient to spot the fakes: lettering was misaligned or words were misspelled ("tabtle" instead of "tablet"). Most of the time, though, the flaws were more subtle.

To examine the holograms, Newton called in a British holography expert named David Pizzanelli. The son of a Florentine painter, Pizzanelli had studied holography at London's Royal College of Art, and his artwork has been exhibited at top British galleries. He has lent his expertise to the Counterfeiting Intelligence Bureau, part of the anti-crime unit of the Paris-based International Chamber of Commerce.

The Jupiter Operation "was extreme in several ways," Pizzanelli says. "It was the first time I'd seen such an abun-

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Bangkok-based freelance journalist **ANDREW MARSHALL** *writes about Asian affairs and is profiled in "From the Editor" on page 3. Photographer* **JACK PICONE** *is based in Bangkok.*

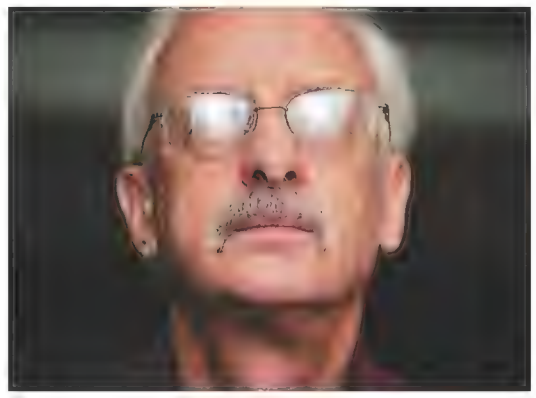
BOTTOM TWO IMAGES: PAUL NEWTON

dance of counterfeits, probably with the exception of Microsoft." (Bogus versions of Microsoft software blanket the world, costing the company billions of dollars.) Pizzanelli identified 14 types of fake Guilin Pharmaceutical holograms. "It's a unique case in terms of how many counterfeit holograms there are. The real one just gets lost in the avalanche of images."

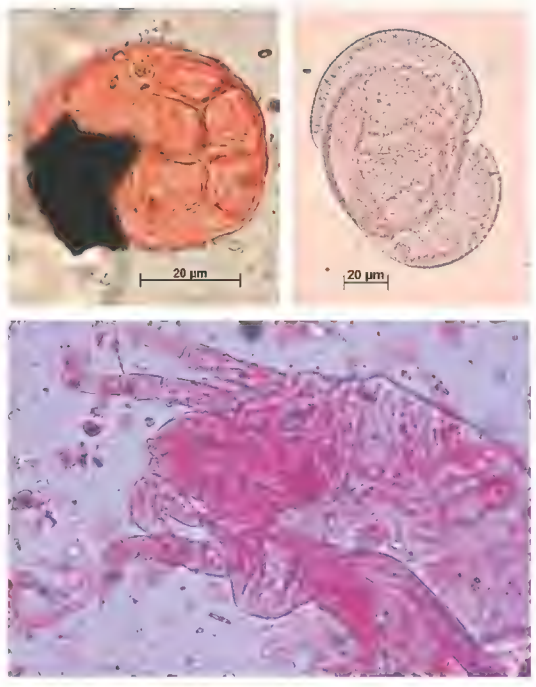
The hologram that Guilin itself puts on its artesunate packages—two mountains above a coastline with rolling waves—was fairly rudimentary to begin with. Some counterfeit copies were "deeply awful," he recalls. "The first two weren't even holographic," including an illustration etched into rainbow-colored foil. Some of the bogus holograms were well crafted but had clear errors: the waves were too flat or the mountains sprouted extra plateaus.

But a couple of the fake holograms exhibited flaws that defied easy detection: the colors were just slightly brighter than the genuine article, or the 3-D image had slightly more depth than Guilin's hologram. One hologram Pizzanelli studied was actually more sophisticated than the real article. Buyers would be "guided towards the fake," he says, "because the fake was better made than the genuine." That troubled Pizzanelli, who says he'd never before done holography detection with a "life-or-death implication."

"We were all working on pieces of a puzzle. . . . A picture of where many of these counterfeits were coming from began to emerge."



Using a microscope, forensics expert Mildenhall (above) found fake tablets containing (below, clockwise from top left) *Acacia* pollen with charcoal, *Pinus* pollen and a dust mite nymph.



Green, of the CDC, had previously developed an inexpensive field test for detecting fake artesunate pills. In Atlanta, for the Jupiter Operation, his lab separated, identified and measured the contents of the pills. The fakes contained an astonishing variety of drugs and chemicals, some of them downright toxic. There was metamizole, a drug that can cause bone marrow failure and is banned in the United States; the outmoded drug chloroquine, which might have been added to create the bitter taste that many Asians associate with effective antimalarials; and acetaminophen, a pain reliever that can dull such malaria symptoms as pounding headaches and fool patients into thinking they're getting better. Jupiter Operation analysts also found safrole, a carcinogenic precursor to MDMA—better known as the illicit narcotic Ecstasy. The traces of safrole suggested that the same criminals who produced party drugs were now producing fake antimalarials.

Making matters worse, some of the bogus pills contained small amounts of genuine artesunate—possibly an effort to foil authenticity tests—which could cause the malaria parasite, spread by mosquitoes, to develop resistance to the leading drug treatment for the disease in Southeast Asia. That would be a public health disaster, researchers say. "We were shocked to find out how serious the problem was," says Newton.

The chemists also found that the fake drugs could be identified by their excipient—the inactive substance that carries the active ingredient in a tablet. The main excipient in Guilin artesunate is cornstarch. But geochemists on the team identified the excipient in some counterfeits as a particular type of calcium carbonate mineral, called calcite, which is found in limestone. That discovery would later take on greater significance.

THE JUPITER OPERATION was the first time that palynology—the study of spores and pollen grains—was employed to trace counterfeit drugs. Plant species produce millions of pollen grains or spores, which end up almost everywhere. If a pollen grain's dispersal patterns (what palynologists call "pollen rain") are known, along with the locations and flowering times of the plants, then pollen can indicate where and when an object originated. Trapped in air filters, pollen can even reveal the routes of planes, trucks and cars.

Dallas Mildenhall is an expert (some would say *the* expert) in forensic palynology. Working from his lab at GNS Science, a government-owned research institute, in Avalon, New Zealand, he is a veteran of more than 250 criminal cases, involving everything from theft to murder. In 2005, Paul Newton asked him if he could extract pollen samples from antimalarials. "I was fairly certain I could," Mildenhall says. He views the trade in fake antimalarials as his biggest case yet. "It is mass murder on a horrendous scale," he says. "And there appears to be very little—if any—gov-

BOTTOM THREE IMAGES: DALLAS MILDENHALL

Corrupt officials plus porous borders (above: the Cambodia-Thailand crossing) make drug counterfeiting a growth industry.

ernment involvement in trying to stamp it out."

In the fake drugs, Mildenhall found pollen or spores from firs, pines, cypresses, sycamores, alders, wormwood, willows, elms, wattles and ferns—all of which grow along China's southern border. (The fakes also contained fragments of charcoal, presumably from vehicle tailpipes and fires, suggesting the phony drugs were manufactured in severely polluted areas.) Then Mildenhall discovered a pollen grain from the Restionaceae family of reeds, which is found from along the Vietnam coast into southernmost China. That location matched the source of the calcite identified by Jupiter Operation's geochemists.

"A mine close to the China-Vietnam border is the only place in the world where this type of calcite is mined," Mildenhall says. The investigators now had two pieces of evidence for the general location of the counterfeit-drug-manufacturing facilities.

Based on their analyses, Jupiter Operation researchers determined that 195 of the 391 random samples were counterfeits. The pollen signatures from nearly all of them suggested that they'd been manufactured in the same region of southern China. The researchers then created a map, pinpointing where each of the 14 fake holograms had been found. The locations suggested the counterfeits were made and distributed by two separate trafficking networks. One encompassed a western region (Myanmar, the Thai-Myanmar border and northern Laos); the other an eastern area (southern Laos, Vietnam and Cambodia). What's more, metronidazole (an antibiotic) and small amounts of artesunate were detected exclusively in the western samples, while erythromycin (another antibiotic), erucamide (an industrial lubricant), sulphadoxine and pyrimethamine (older antimalarials) were found only in the eastern counterfeits.

> "It is mass murder on a horrendous scale. And there appears to be very little—if any—government involvement in trying to stamp it out."

Some seven out of ten Cambodians seek medical treatment from village vendors rather than a clinic (above).

At this stage of the investigation, the Jupiter Operation had done all that it could to locate the counterfeiters' production facilities. "We were able to pinpoint only a general area," says Mildenhall. "We were now totally dependent on the local law enforcement agencies to target that area and find out the precise spot."

WITH EVIDENCE FROM the Jupiter Operation in hand, Ronald Noble, the secretary general of Interpol, met in March 2006 with Zheng Shaodong, China's assistant minister of public security. During the meeting, Noble stressed to Zheng

See the global impact of the mosquito-borne disease at Smithsonian.com/malariamap

"Only when it's severe," says Ouk Vichea, "do they go to the hospital." In a house in Laos (above), a smoky fire wards off mosquitoes.

not only the threat to public health, but the potential profit losses for Chinese pharmaceutical companies.

China's Ministry of Public Security launched its own investigation (it had also arranged for Mildenhall to analyze the samples' pollen). Finally, the authorities arrested three individuals—two buyers and a seller —in southern China for their roles in trafficking 240,000 blister packs of fake artesunate into Myanmar. They were all convicted: two of them were sentenced to one year and nine months imprisonment and one was sentenced to five months imprisonment.

But the manufacturers of the counterfeit artesunate were never found. And only one-tenth of the 240,000 blister packs were seized. The rest disappeared inside Myanmar, where nearly half of all malaria-related deaths in Asia occur, according to the Johns Hopkins Bloomberg School of Public Health.

With only three convictions, was it all worth it? Yes, says Mildenhall, who notes that the number of counterfeit antimalarial tablets entering Southeast Asia dropped the following year. "Just saving a few lives would have made it worthwhile," he adds.

Newton says he was "absolutely delighted" with the Chinese government's response. "We're not suggesting that's the end of the problem," he adds. "Police action will suppress [the trade] but won't eliminate it." And while the Jupiter Operation has emerged as an effective model for investigations into counterfeit drugs, such efforts require political focus as well as money, equipment and unique scientific expertise—all of which tend to be in short supply in developing countries.

In the meantime, Newton says a number of steps could stanch the distribution of counterfeit medicines: cheap, high-quality antimalarials must be made widely accessible; medical authorities in poor countries must be given the financial and human resources to inspect supplies; and health workers, pharmacists and the public must be made aware that drug quality is a matter of life and death.

Assistance from pharmaceutical companies will also be crucial. "They're often the first people to identify fakes, but there's a disincentive for them to declare that because it destroys their market," says White. "So they hush it up."

In 2005, White and Newton wrote to 21 major drug manufacturers, asking what their policy would be if they learned that any of their products were being counterfeited. Only three companies replied that they would contact drug regulatory authorities.

Newton praised Guilin Pharmaceutical for taking part in the Jupiter Operation. Still, confidence in Guilin-made artesunate appears to have been shattered. I spoke to the owners of a dozen mom-and-pop drugstores in Pailin, Cambodia, and none stocked Guilin's artesunate. "I don't dare sell it," says Ruen Mach, whose small shack in Cheav village brims with sun-faded packets of medicine.

Local residents once claimed they could tell the real thing by the quality of the packaging, or by the steepness of the mountain peak that makes up the Guilin logo. Not any more.

In another malaria-stricken area of Cambodia, I showed a medic named Rous Saut a photo of the two blister packs that Ouk Vichea had shown me.

"This is probably fake," Rous Saut said. He was pointing to the genuine one.

TREKKING

HADRIAN'S WALL

The second-century Roman fortification stretched across Britain. A hike along its remains leads to spectacular crags, idyllic villages, windswept marshes, local brews—and a renewed appreciation of Rome at the height of its power

BY ANDREW CURRY

PHOTOGRAPHS BY SISSE BRIMBERG AND COTTON COULSON

Where fierce legionaries once marched, history buffs (students from Newcastle Church High School) nowadays hike.

In A.D. 122, a few years after taking control of the Roman Empire, which reached its greatest expanse by the time of his rule, Caesar Publius Aelius Traianus Hadrianus Augustus trekked to the edge of the known world. It was a bold journey, one that few of his contemporaries cared to make. "I would not like to be Caesar, to walk through Britain," a waggish poet wrote at the time.

There's no way to be sure how long he stayed in Britain or what he did there, but Hadrian apparently left orders to construct one of the most formidable building projects the world had ever seen: a wall 15 feet high and up to 10 feet thick, stretching from sea to sea.

A wall? Scholars debate what Hadrian (a second-century bronze) had in mind.

Hadrian's Wall has long attracted hikers and history buffs and is now the heart of an 84-mile-long National Trail that winds through some of England's most scenic countryside, following in the footsteps of Roman soldiers who once patrolled the empire's frontier. Not long ago, I set out to see Hadrian's monumental fortification, crossing England east to west in search of the island's Roman past.

I began in Wallsend, a town outside Newcastle, in the shadow of shipyard cranes, where a small museum of Roman artifacts marks the wall's eastern terminus at the River Tyne. In Roman days, there was a four-acre fort here called Segedunum ("strong fort" or "victory fort"); today, all that remains are a few of the fort's stone foundations and a carefully reconstructed Mediterranean-style bathhouse guarded by a few bored-looking men in legionary costume.

Across the street, I got my first glimpse of the wall itself. A few dozen feet of sturdy stonework faces a row of squat brown brick townhouses, then disappears into a suburban development. I followed the dashed purple line for the wall on my official map past warehouses and abandoned lots, across a tangle of overpasses, raised walkways and bridges, and into bustling downtown Newcastle. Here the modern trail hews to the Tyne, but I took a shortcut along the main highway, a busy six-lane thoroughfare that runs close to where the wall once stood. The Roman surveyors did a good job: the A186 heads west from Newcastle in a straight line, twisting

Possibly built to repel hostile forces, the wall has not entirely withstood the threat of modernity (a remnant near Newcastle).

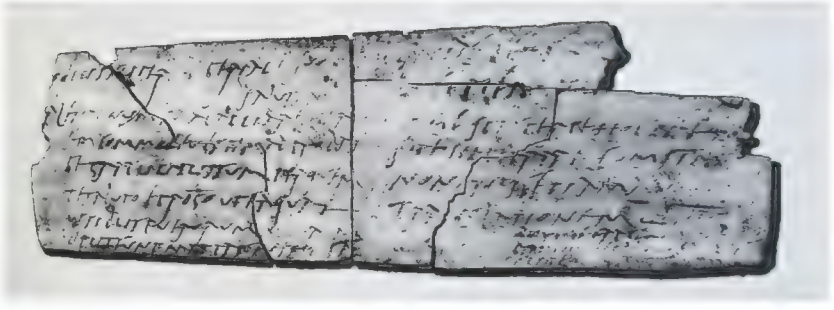
and turning only to follow the ridgeline. The wall suddenly appears again for about ten yards on the city outskirts, in a parking lot between an auto parts store and Solomon's Halal Punjabi Indian Cuisine.

Planning the trip, I had assumed I could make 15 or 20 miles a day. After all, Roman soldiers in leather sandals are said to have averaged about that distance, with time enough at the end of each march to build a fortified camp. But for the first couple of days I limped into bed-and-breakfasts after about eight miles with blisters on top of my blisters.

So on the third day I hopped a bus from Tower Tyne to one of the most important sites along the wall: Vindolanda ("white lawns," possibly after a native term), a Roman fort that predated the wall and covered four acres in Hadrian's day; it supplied and housed soldiers who manned the wall's 80 milecastles, akin to small forts, and 160 turrets. Robin Birley, 74, a stooped, bespectacled man proffering a muscular handshake, has been conducting an archaeological dig at Vindolanda for more than 50 years; his father began digging here in 1930, and Robin's son, Andrew, directs excavations at the site. The nearby house in which Robin Birley grew up is now the Chesterholm Museum, home to Vindolanda artifacts.

MAP: GUILBERT GATES

Vindolanda digs have yielded riches (clockwise from left: excavator Andrew Birley; c. A.D. 100 tablet and boot; c. A.D. 250 cup).



While digging a drainage ditch in 1972, Robin Birley punched through thick clay and found a large deposit of organic artifacts, including leather shoes, animal bones and wooden combs—all preserved by wet, oxygen-poor soil. Most important, Birley and his team have turned up almost 1,400 thin wooden writing tablets, inked in Latin, from A.D. 85 to 160. There are military documents, lists of kitchenware and other ephemera, including the oldest known examples of women's writing in Latin. "On the third day before the Ides of September, sister," to cite one letter, "for the day of the celebration of my birthday, I give you a warm invitation to make sure that you come to us, to make the day more enjoyable for me by your arrival."

The tablets reveal an army concerned with order and minutiae, from requests for leave to beer inventories. "The documentary evidence is unbeatable," Birley said. "It's like listening in to private conversations."

At the height of Roman Britain, in the second and third centuries A.D., 15,000 troops and engineers were stationed along the wall, and another 15,000 to 18,000 legionaries were elsewhere in Britain; together, they made up one of the largest imperial forces outside of Rome. Still, few histories from the period survive—and those that do focus more on politics in Rome than battles on the periphery. "There's practically a whole century without any reference to what was going on in Britain at all," says David Breeze, a Scottish archaeologist and author of the latest edition of *J. Collingwood Bruce's Handbook to the Roman Wall*. "Apart from the Vindolanda tablets, we have enormous gaps, and we're never going to fill them."

But a biography written more than 200 years after Hadrian's death links the emperor to the wall: "Hadrian was the first to build a wall, 80 miles long, to separate the Romans from the barbarians."

One thing that is clear is that the wall was built at the end of an extraordinary period of expansion. From its earliest days, the Roman army had a hard time staying put. Led by generals hungry for glory—and perhaps a shot at becoming emperor—the legions constantly sought new conquests. From the first century B.C., a string of ambitious leaders pushed the boundaries of the empire steadily outward, to Britain and elsewhere. Julius Caesar crossed the English Channel in 55 B.C. and returned a year later. In A.D. 43, Claudius invaded England near Richborough, in Kent, and his successors pushed the island's Roman frontier north. By

the end of the first century, Roman troops had forced their way deep into what is now Scotland. Trajan, crowned emperor in A.D. 98, fought wars in Dacia (present-day Romania), Parthia (Iran) and Germania.

When Trajan died in 117, his protégé Hadrian—an experienced military commander born into a prominent family, who spoke Greek, wrote poetry and took an interest in philosophy and architecture—inherited an empire and an army stretched to the breaking point. "He realizes they've expanded too far, too fast," Birley said. "Somehow he has to get the message across: 'This far, no farther.'"

In 122, Hadrian visited Britain, and though his exact itinerary isn't known, historians believe that he toured the frontier. What better way to define the edge of his empire and keep his army out of trouble, the emperor-architect might have decided, than a monumental stone wall?

Berlin-based **ANDREW CURRY** *last wrote for* SMITHSONIAN *about Gobekli Tepe, a Neolithic temple in Turkey. Photographers* **SISSE BRIMBERG** *and* **COTTON COULSON** *live in Denmark.*

After a night at Greencarts Farm, just west of Chollerford, the morning dawned gray and cold. As I sat on the porch taping my bruised feet and lacing my muddy boots, the landlady brought the bill. "Just remember, there's always the bus," she said. Her accent rounded "bus" into a gentle "boose." I headed out through the farmyard into a drizzle, weighing her words carefully.

My spirits picked up almost immediately. At the edge of the farm, the wall reappears, rising to five or six feet in some spots. I soon climbed out of the low, rolling farm country to the top of the Whin Sill, a jagged ridge jutting hundreds of feet above the valley. It's lined with unbroken stretches of wall for miles at a time. Over the next two days, the wall was an almost constant

An estimated 15,000 Roman soldiers were stationed along the wall (clockwise from left: Winshields Crags, the highest point at 1,131 feet; the milecastle at Cawfields; David Breeze, in Newcastle at the tomb of influential wall scholar J. Collingwood Bruce).

presence. This center section, roughly ten miles long, remains the most rural, unspoiled and spectacular part of the walk.

At mile 36, I came upon Housesteads, a five-acre fort known to the Romans as Vercovicium ("hilly place" or "the place of effective fighters"). Draped over the lush green hillside, its extensive ruins were excavated more than a century ago; even so, the site is daunting. This was no temporary outpost: the commander's house had a courtyard and a heated room, the fort's latrines had running water and there was a bathhouse for the troops.

West of the fort, the wall climbs to Highshield Crags. Following the wall as it runs steeply up and down took my breath away. One can hardly imagine the ordeal the builders endured dragging the stones, lime and water up these rugged peaks—a ton of material for each cubic yard of masonry. The wall, according to some estimates, contains more than 1.7 million cubic yards.

Atop the ridge at least 100 feet above the valley and barricaded behind their stone wall, Roman soldiers must have gazed north with a sense of mastery. An earthwork consisting of a ditch 10 feet deep and 20 feet across and with two mounds on either side, known as the Vallum, ran just south of the wall, where there was also a wide road to move troops from one post to the next. On long stretches of the wall's north side, another deep ditch posed yet another obstacle. In some places the ditches were carved out of solid bedrock.

What were the Romans so worried about? Breeze says

the Roman frontier wasn't primarily about defending the empire against barbarian attacks, as some archaeologists have argued. "Built frontiers aren't necessarily about armies attacking, but about controlling the movement of people," he says. "The only way you can fully control things is to build a barrier." Used for administrative control, not warding off invasion, it funneled people through designated access points, such as the gates that appear at regular intervals along the wall. The wall, he suggests, was more of a fence, like the one that runs along parts of the United States-Mexico border.

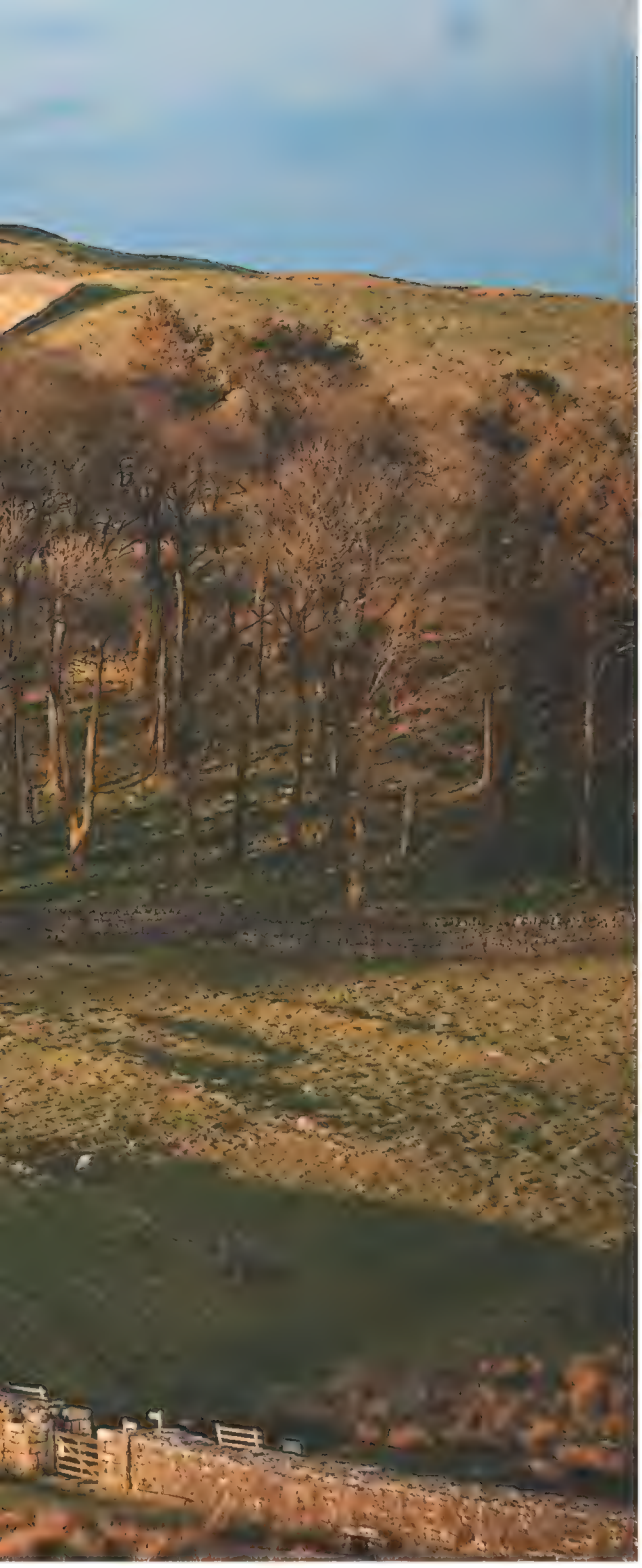
Even so, the wall also served to keep out not just "casual migrants" but enemies, says Ian Haynes, an archaeology professor at Newcastle University. In the past decade, excavators have turned up extensive pits that had held posts, possibly for sharpened stakes, fronting parts of the eastern section of the wall. "The kind of effort that goes into these defenses isn't just for decorative purposes," says Haynes. "It's wise to think that they were doing this in deadly earnest." Archaeologists have long searched for traces of the tribes who lived north of the wall, partly to assess the threats the Romans faced.

After breakfast of beans and toast in the town of Twice Brewed, I again headed to the top of the Whin Sill, where the route goes up and down rocky crags. Cresting the trail's last big hill late in the afternoon, I saw the sunlit roofs of Carlisle, a town about ten miles to the west. Looking to the south across the (aptly named) Eden Valley was like paging through a picture book of 19th-century England. Cottages were tidily tucked among green-grid pastures threaded by wooded lanes. On the far side, a train chugged west.

A few miles on, I reached the village of Walton. After 18 miles of hiking, my only concern was getting off my feet. I unhooked a metal cattle gate and walked up a muddy path to Sandysike Farm. Built in 1760—probably with stones filched from the wall—the white farmhouse straddles the line of the wall, and the path runs along the back fence. Richard Sutcliffe, the owner, greeted me at the gate and led me into his messy, concrete-floored kitchen, where a three-legged black Lab, two Jack Russell terriers and four Jack Russell puppies competed for attention.

Over a mug of tea, Sutcliffe said that the new walking trail has been a blessing for the farms and towns along the wall's path. "It's harder and harder to make farming pay these days," he said. A few years ago, Sutcliffe and his wife, Margaret, converted an old stable into a bunkhouse. Between May and mid-

For more on the sights along the wall, visit Smithsonian.com/hadrian



Perhaps the best preserved of the wall's 16 forts, the five-acre Housesteads is now a national park (clockwise from left: looking east from the fort; the present-day entrance; stone pillars that supported the wooden floor of the Roman fort's granary).

September, the Sutcliffes are booked nearly solid; some of the hikers I met along the trail had made reservations nine months in advance. (To prevent erosion of the trail, authorities discourage visitors from walking it in the rainy season, from November to April.) Lured by the promise of Cumberland sausage made from local pork and a beer or two, I gingerly pulled my boots back on and headed up the road to the Centurion Inn, part of which stands atop the site of the wall.

In the six years since the Hadrian's Wall trail was designated a national landmark, more than 27,000 people have walked it from end to end. Some 265,000 hikers spend at least a day on the trail each year. Unesco has designated Hadrian's Wall and the ancient Roman border in Germany as part of a larger World Heritage site, the Frontiers of the Roman Empire; archaeologists and preservationists hope to add sites in other nations to outline the empire at its greatest.

Traveling the course of Hadrian's great fortification over six days, I got a sense of how the wall defined what it was to be Roman. Between Wallsend and Bowness-on-Solway, the western terminus, a line was drawn: Roman citizens and other cosmopolitan residents from across the empire on one side, barbarians (as the Romans termed everyone else) on the other.

At places along the wall, Rome rules again (the Centurion Inn).

On my last day, I crossed wide stretches of windy, flat fields and marshlands and munched on the last blackberries of the season as I headed to Bowness.

A white gazebo overlooking the Solway River marks the finish—or, for some, the start. A carved sign over the entrance reads "Wallsend 84 miles." A retired British sailor in an argyle sweater stood under the hut's roof. "We're at the end of the world out here," he said with a smile.

Teaching Cops to See

Amy Herman uses art to sharpen police officers' observation skills

BY NEAL HIRSCHFELD PHOTOGRAPHS BY AMY TOENSING

Early one morning a bunch of New York City police officers, guns concealed, trooped into the Metropolitan Museum of Art. Inside a conference room, Amy Herman, a tall 43-year-old art historian and lawyer, apologized that she hadn't been able to provide the customary stimulant. "I usually try to give you coffee with plenty of sugar to make you talk more," she said.

The officers, all captains or higher in rank, were attending "The Art of Perception," a course designed to fine-tune their attention to visual details, some of which might prove critical in solving or preventing a crime. Herman laid out the ground rules. "First, there are two words that are not allowed—'obviously' and 'clearly'—since what's obvious to you may not be ob-

"How would you describe this woman in one sentence?" Herman (at the Metropolitan Museum with Sargent's *Madame X*) asks her class of cops. Some say it helps them make arrests (inset: Times Square).

"I can see where this would be useful in sizing u

vious to someone else. Second, no reading of labels. For purposes of this exercise, we are not focusing on who the artist was, the title of the work or even when it was created. Third, I want hands back, no pointing. If you want to communicate something, you have to say, 'Up in the left-hand corner, you can see . . . ' "

Herman did not want to talk about brush strokes, palettes, texture, light, shadow or depth. Schools of painting and historical context were moot. Suspecting that some of the cops were first-timers to the Met, she tried to ease the pressure. "Remember," she said, "there are no judgments and no wrong answers."

She showed slides of paintings by James Tissot and Georges de La Tour. There was an Edward Hopper in which a hatted, forlorn-looking woman sits alone at a table, sipping from a cup.

"OK, what do we see here?" she said.

"A woman having a cup of coffee," answered one of the cops.

"Unlike us," another said.

Herman said, "Do we know it's coffee?"

"If it was tea, there would be a spoon."

"Or a pot, like in England."

A Caravaggio appeared on the screen. In it, five men in 17th-century dress are seated around a table. Two others stand nearby, and one of them, barely discernible in shadow, points a finger—accusingly?—at a young man at the table with some coins.

Among the officers a discussion arose about who robbed whom, but they soon learned there could be no verdict. No one was being accused or arrested, Herman said. The painting was *The Calling of St. Matthew*, and the man in the shadow was Jesus Christ. The cops fell silent.

Later, Deputy Inspector Donna Allen said, "I can see where this would be useful in sizing up the big picture."

Herman led the students upstairs into a gallery. The cops split into two- and three-person surveillance teams, each assigned to a particular artwork.

One team huddled in front of an enormous painting in

Thanks to art class, Assistant Chief Anderson (in an NYPD training facility) says he gives more specific orders to investigators.

See the Metropolitan Museum's images from Amy Herman's course at Smithsonian.com/herman

ALL PHOTOS BY AMY TOENSING / REPORTAGE BY GETTY IMAGES

p the big picture," said Deputy Inspector Allen.

which a heavily muscled man with close-cropped hair was being manhandled by a throng of armored ruffians and a buxom woman who was tearing off his shirt.

Robert Thursland, a 52-year-old inspector who looked trim and corporate in his gray suit, gave the class the skinny. The painting appeared to depict the end of a trial, and the muscle-bound fellow was "possibly being led off to be tortured," said Thursland. The woman tugging at his clothes was part of the lynch mob, he added.

Herman revealed that the officers had been scrutinizing a 17th-century Guercino painting of Samson after his capture by the Philistines—the woman, of course, was Samson's lover and betrayer, Delilah. That corroborated suspicions in the room as to victims and perps, and everyone seemed to agree the case could be closed.

In another gallery, a squat Congolese power idol, embedded with nails and gouged with holes and gaping gashes, appeared to be howling in pain. "When you came through these doors," Herman said, "what struck you about him?"

Assistant Chief George Anderson, who commands the Police Academy, said with a sigh, "First thing I thought, 'Boy, this guy caught a lotta flack. I kinda felt it was me.'"

Back in the conference room, Herman had the group pair up and take seats. One person faced forward while the other sat with his or her back to the screen. The officers who could see the pictures described them to their partners. One slide showed the well-known 1970 photograph of a teenage girl at Kent State kneeling beside a student who has been shot by the National Guard.

Anderson told his backward-facing partner: "The woman is obviously distraught."

Ms. Herman scolded, "Uh-oh, I heard an 'obvious' out there!"

"Oops!" he said. "That's the second time I did that."

Another photograph showed two couples standing side by side. Herman cautioned that neither should be identi-

Lt. Hollywood (in Times Square) credits Herman's workshop with giving him a sharper eye for burglars and pickpockets.

"The captains enjoy analyzing the crime scene," says Herman (with Jerry Garcia, with hands folded; Brian Franklin, with hands in pockets; and Patricia MacDonald). They're looking at Georges de La Tour's *The Fortune Teller*, in which a man is being robbed.

fied by name, only by body language. The consensus was that the younger couple looked happy, playful and brimming with enthusiasm, while the older couple seemed stiff, worried and ill at ease.

Eyeballing the older couple, Thursland offered, "They don't know where they're gonna be living come January."

They were George and Laura Bush; the younger couple, Barack and Michelle Obama.

Herman, who grew up in Somerset, New Jersey, and earned a master's degree in art history as well as a law degree, began her career as an attorney in a private firm. But after a while her lifelong love of art held sway, and she went on to manage programs at the Brooklyn Museum of Art, assist the director of the Frick Collection in Manhattan and give lectures on 19th-century American and French paintings at the Met (which she still does). She's currently the director of educational development for the New York City public television station WNET. She began teaching her three-hour "Art of Perception" course at the Frick in 2004, to medical students at first. Then, over pizza one night with a friend who wondered why Herman limited her students to future physicians, Herman recalled a harrowing experience she had had while studying law at George Washington University.

Assigned by a professor to accompany police on patrol runs, she had raced with two cops to the scene of a raucous domestic dispute. Standing on the landing below, Herman watched one officer bang on an apartment door while the other nervously fingered his handgun. What the first officer saw when the door opened—a whining child, say, or a shotgun-toting madman—and how he communicated that information to his partner could have life-or-death consequences, she realized.

The following Monday, Herman made a cold call to the New York City Police Academy to pitch her course. And

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NEAL HIRSCHFELD's *latest book,* Dancing With the Devil, *the true story of a federal undercover agent, will be published next year. Photographer* **AMY TOENSING** *is based in New York City.*

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"Don't just look at a picture and see a picture. See what's happening," says FBI agent Reiner.

AMY HERMAN CONTINUED FROM PAGE 52

four months later, she was teaching NYPD captains at the Frick. One comment she remembers was an officer's take on Claude Lorrain's 17th-century painting *Sermon on the Mount*, in which a crowd gazes up at Jesus. "If I drove up on the scene and saw all these people looking up," the cop said, "I'd figure I had a jumper."

Herman, speaking to the class I attended, underscored the need for precision by recounting the murder of a woman whose body was not found for more than a year, partly, according to news reports, because of a commander's vague instructions about where to look for it.

Anderson, who is often called to crime scenes, took the lesson seriously. Instead of ordering detectives generally to "search the block" for shell casings, weapons or other evidence, he said he would now tell them specifically to start at the far end, work their way back to the near end, look under all the parked cars, behind the gated areas, in the shrubbery, in the garages and in the trash cans.

One of Herman's graduates, Lt. Dan Hollywood, whose last name seems well-suited to his Jimmy Stewart-like demeanor, said her pointers have helped snag pickpockets, handbag snatchers and shoplifters who prowl the Times Square area. Hollywood coordinates the Grand Larceny Task Force of 24 plainclothes officers. "Instead of telling my people that the guy who keeps looking into one parked car after another is dressed in black," he explained, "I might say he's wearing a black wool hat, a black leather coat with black fur trim, a black hoodie sweatshirt and Timberlands."

New York's finest aren't the only law-enforcement types to benefit from Herman's teaching. Other students have included U.S. Secret Service agents and members of the Department of Homeland Security, the Transportation Security Administration, the Strategic Studies Group of the Naval War College, the National Guard and, during a visit to London, the Metropolitan Police of Scotland Yard.

Perhaps the most vivid illustration of art's crime-fighting power involved a task force of federal, state and local officers investigating mob control of garbage collection in Connecticut. One FBI agent went undercover for 18 months, and during that time, as it happened, attended one of Herman's classes at the Frick. According to Bill Reiner, the FBI special agent who heads the task force, Herman's exercises helped the undercover agent sharpen his observations of office layouts, storage lockers, desks and file cabinets containing incriminating evidence. The information he provided led to detailed search warrants and ultimately resulted in 34 convictions and government seizure and sale of 26 trash-hauling companies worth $60 million to $100 million.

"Amy taught us that to be successful, you have to think outside the box," said Reiner. "Don't just look at a picture and see a picture. See what's happening."

Herman has taken her lessons to heart. When her 7-year-old son, Ian, was in preschool, his teacher worried that he wasn't verbal enough and suggested that Herman try some of her exercises on the boy. Herman pressed him to describe in detail what he saw when they were at home or on the street. "It worked!" Herman says. "We started talking about all the things we see and why we think they look that way, and he hasn't stopped talking since."

It was a ride in a patrol car, when she watched an officer arrive at the scene of a domestic dispute, that inspired Herman to offer her art class to police.

She encounters frequent reminders of her pedagogy's impact. While riding the subway not long ago, Herman noticed two burly men giving her the eye. They were unshaven and dressed in shabby attire. They made her nervous, and she got ready to get off the train at the next station.

Then one of the men tapped her on the elbow. "Hey," he said, "we took your course. We're cops."

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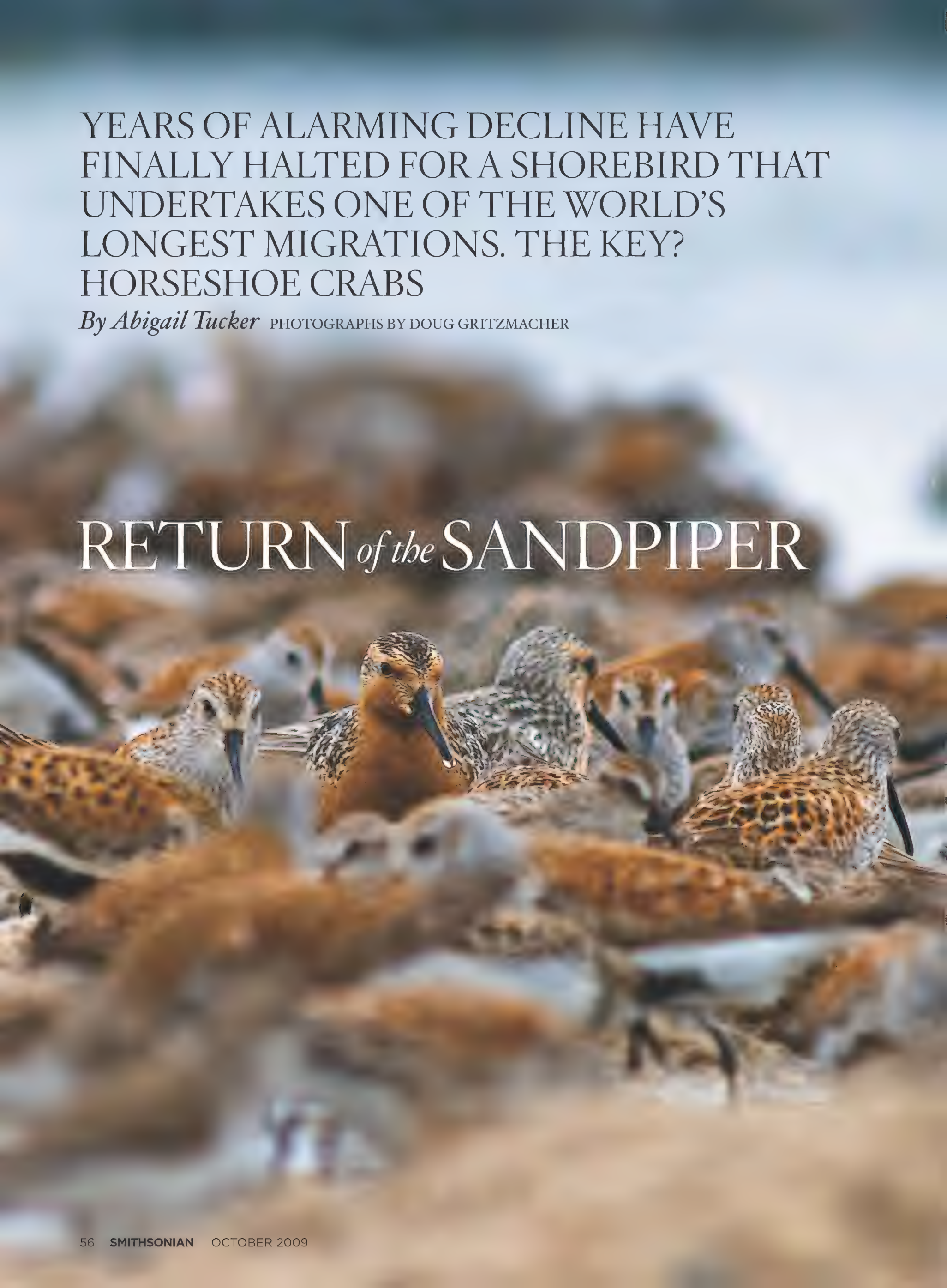
By Abigail Tucker PHOTOGRAPHS BY DOUG GRITZMACHER

RETURN *of the* SANDPIPER



Heading to Canada from as far away as Argentina, red knot sandpipers stop to feast on the eggs of horseshoe crabs (this page) at Delaware Bay (opposite: a red knot surveys the scene at the center of a mixed flock). The bird's survival is profoundly linked to the crabs, a species older than dinosaurs.

The horseshoe crabs come from the deep, summoned by the big spring tides. Plodding and clumsy, the crabs plow along the continental shelf and through the silty waters of Delaware Bay, then drag themselves onto beaches to lay their eggs—with occasional detours to boat launches and coastal roads and waterfront parking lots. Easily flipped by waves or stranded by retreating surf, their bodies litter the shoreline like rusting artillery from a forgotten war. But their tails tick back and forth in the sand, like metronomes. They only look dead.

The red knots descend from the sky. Plain, stocky sandpipers, they can fly a distance equivalent to a trip to the moon and back over the course of their lifetimes. They exude a twitchy, almost manic energy. Many have come from Tierra del Fuego, at the tip of South America. After a brief rest in Brazil, they travel almost 5,000 miles straight to Delaware Bay on the way to their Arctic nesting grounds. Upon arrival in the bay, they are basically starving, their breastbones protruding from their downy red chests.

Each May, the birds and the crabs meet on the beach.

It's a vital rendezvous. The emaciated red knots, in the midst of one of the world's longest migrations, have two weeks to double their body weight for the non-stop flight over Canada's vast forests to the polar tundra where they breed. Luckily, Delaware Bay's beaches are the site of the world's largest horseshoe crab spawning, which has historically generated a superabundance of fat- and protein-packed eggs.

Whole conga lines of crabs assemble at high tide, females as big as dinner plates tailed by salad-plate- and saucer-size suitors. The females dig holes in the sand and deposit sticky piles of wasabi-colored specks, which the males fertilize in the nest. Because there are so many crabs, they often kick up each other's nests, bringing the eggs to the surface.

Few birds that stop on Delaware Bay fly farther than the red knot (left: its route).

Exposed eggs are no longer viable, but they still support life. The tiny red knots gobble some 25,000 eggs a day apiece—something like a person eating 700 chicken eggs in 24 hours—and so undergo one of the most rapid weight gains of all animals. By the end of their fortnight layover, some birds achieve outright corpulence, their breasts swaying pendulously with every step. When the restless flocks finally sound their departure calls in late May or early June, the fattest individuals sometimes struggle to achieve lift-off.

The Delaware estuary is considered one of the most im-

When red knots descend on Delaware Bay, so, too, do researchers (far left: Jim Lyons and Olin Allen with netted birds) to assess them (second from left). Recent limits on harvesting horseshoe crabs (center: animals collected in 1924 for fertilizer) have boosted their numbers (second from right: Rachel Emory does a census) and led to more of the eggs (far right) red knots eat.

MAP: GUILBERT GATES

portant shorebird stopover zones in the world, largely because of the supply of horseshoe crab eggs. But lately red knots and other migratory species have been having trouble gaining even the minimum weight necessary to continue their journeys. Since the mid-1980s, the number of visiting red knots, once close to 100,000, has fallen by more than 75 percent, to fewer than 25,000.

Scientists blame the decline on the harvest of horseshoe crabs for fishing bait, a practice that increased an estimated twenty-fold in the 1990s. States along the Atlantic Coast have since halted or restricted the harvest, and the crabs are now showing preliminary signs of recovery. For the birds, it's not as clear. In 2003, the knots were so thin they simply lacked the energy to reach the Arctic; they stopped in southern Canada and skipped an entire breeding cycle. About 15,000 passed through Delaware Bay that year, and the numbers haven't improved much since. Some scientists have forecast the imminent extinction of the rufa red knots (*Calidris canutus rufa*), the most common North American subspecies, which have historically relied on the crabs to refuel.

And so these days a third species flocks to Delaware and New Jersey's marshy shores: concerned ornithologists and birders from all over the world, armed with tagging gear, cannon nets, tide charts, trays of vegetarian lasagna to keep their strength up and jumbo bottles of wine. Each spring they pitch tents on the beach or crash in rental houses, keeping vigil via telescope.

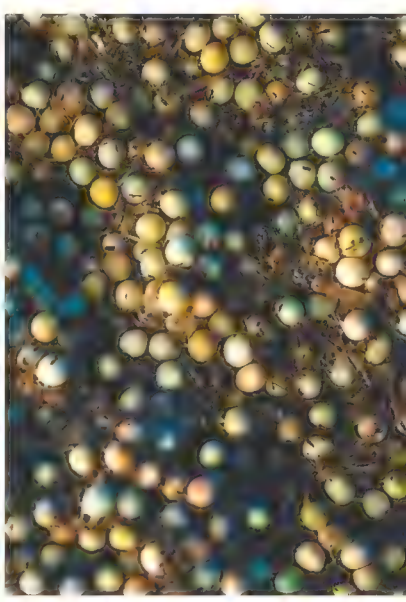
The morning fog that enfolded wooden pilings and moored boats in Mispillion Harbor also helped to hide several dozen men and women crouched behind scraggly bushes. The stretch of sand before them gradually darkened as shorebirds—ruddy turnstones, semipalmated sandpipers and plenty of red knots—touched down and began jackhammering for eggs. The knot's distinctive call—*whit-whit!*—was lost in the greedy din. Suddenly spooked ("It wasn't me!" someone hissed over the two-way radio), the big flock levitated for a moment and sank back down to the beach. Feasting resumed. "Get ready, base camp," the radio crackled.

Then: Boom! A miniature cannon on the beach spewed a net as big as a swimming pool cover over the birds, which, now trapped, bounced like microwave popcorn in a bag. The birders, most of whom were wearing unwieldy waders, stormed out of the mist and fell to their knees in the sand to start sorting the several hundred captured knots and other shorebirds, placing them in burlap-covered boxes, which they hustled up the beach. There, volunteers sat in circles of folding chairs, passing the birds around briskly: every second in captivity was costing the birds precious calories. The flocks had arrived en masse 11 days earlier and would be leaving for the Arctic soon.

"More knot, I need more knot!" a British ornithologist called out when her box was empty. Everyone, including (understandably) the birds, was quite frantic, and I was soon recruited to help. In my hands the knots felt frighteningly light, as though they had soda straws for bones. Imagining them flying from Tierra del Fuego seemed almost silly, like picturing a paper airplane reaching the stratosphere.

Some workers plucked breast feathers (for determining a

BELOW: PP. 58-59 DELAWARE PUBLIC ARCHIVES



bird's sex) and bits of wing feathers (chemical analysis can reveal where it spent the winter); others measured beak lengths or affixed colored tags. The legs of many knots were already bangled with multiple tags from ornithologists in other parts of the world: red for Chile, orange for Argentina, blue for Brazil and green for the United States. (Though all rufa red knots breed in Canada, they winter along the eastern coast of the Americas.) Most coveted of all were birds whose coded tags showed that they had been caught in Delaware just a few days earlier. These birds were inserted gently into tubes resembling toilet paper rolls, to keep them still, and placed on scales, to see exactly how many grams they'd gained. The rest of the birds were also weighed, to get a sense of how the flocks were faring. Many knots had arrived weighing less than 100 grams. Ideally they would weigh at least 180 grams by the time they left.

Kevin Kalasz leads one project.

"Oh, I've got a really skinny one," said volunteer Richard du Feu softly, examining the scrawny knot in his hand. "This one almost certainly won't make it to the breeding grounds."

Yet many people expressed some optimism about the 2009 season. They've learned, after more than a decade of disappointing migrations, not to count their knots before they hatch, but the team had estimated an impressive 25,000 birds in a survey the night before—many more than usual. It's possible that some red knots shifted their migration route in past years to scrounge for food sources beyond the bay. If so, some of those birds may be back, perhaps because there has been mild weather and crab eggs aplenty so far. Then again, last year's spawning had seemed bountiful, too, until a Mother's Day storm cooled the water and the crabs stopped laying. "Birds arriving in the middle of May expecting crab eggs didn't get any," said Kevin Kalasz, who oversees the state-run Delaware Shorebird Project. The knots left for the Arctic a week late, still disastrously underfed.

As the captive birds were released one by one to resume pecking in the sand, the tide eased in and horseshoe crabs approached the shore, great masses of them turning like gears in the shallows. Soon there were so many crabs you could hear them moving through the water, a sound like a slow boil.

Normally, red knots double their weight refueling on horseshoe crab eggs, then take off for breeding grounds near the Arctic.

Delaware Bay's diminutive waves, temperate water and sandy beaches make it a haven for horseshoe crabs (*Limulus polyphemus*). They are rare outside of North America's Atlantic Coast, although there are other horseshoe crab species in Asia. The creatures predate the dinosaurs and, as part of a group called chelicerates, are closer cousins to spiders than to true crabs, which are crustaceans. Nigel Clark, a research scientist

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See and hear more sandpipers at Smithsonian.com/shorebirds

with the British Trust for Ornithology, whose T-shirt sported a glow-in-the-dark horseshoe crab, called their spring spawning "one of the world's great spectacles." Crabs in more southern waters spawn throughout the year, but in the chilly mid-Atlantic they are sluggish until the ocean starts to warm. When it reaches 56 degrees, it's time to storm the beaches. The spawning lasts from late spring into August, but the high point is the last new or full moon of May, when the tides are strongest; eggs laid at the high waterline are more protected from the surf.

Locals used to grind up horseshoe crabs for fertilizer or livestock feed. The crabs' commercial value rose in the early 1970s, when scientists realized that an extract of their copper-based blood, which is a lovely cornflower blue, could be used to test for toxins in injectable drugs and in medical devices such as pacemakers and syringes. (It contains a clotting agent that is hypersensitive to toxic bacteria.) Several companies currently run labs where captured crabs are bled

"One of the world's great spectacles" is regaining strength.

of roughly a third of their blood, then sent back into the sea. Most crabs reportedly recover within a week, though some environmentalists claim that the mortality is likely higher than the 7 percent to 15 percent the companies estimate.

Then, in the 1980s, with stricter regulations on other catches, Delaware Bay fishermen entered the emerging Asian market for conch and eel. Horseshoe crabs, chopped and frozen, particularly the big, spawning-age females, made great bait. By the mid-1990s, nearly three million crabs were being caught each year along the Atlantic Coast. There were still a lot of crabs left—but not the critical density needed to kick up each other's nests, making eggs accessible to knots and other birds.

Largely out of concern for the birds, the Atlantic States Marine Fisheries Commission issued its first horseshoe crab harvest restrictions in 1998, and regulations have steadily tightened since. New Jersey currently has a moratorium on harvesting horseshoe crabs. Delaware limits the catch to 100,000 males taken outside the knot-migration season, and Maryland and Virginia have also cut back. Fishermen are finding ways to use fewer crabs as bait, and researchers are trying to develop an artificial bait to replace the crabs entirely.

Female crabs take ten years or more to mature, so the offspring of the first crabs spared after 1998 are only now ready to mate. Their presence might help explain the spectacular spawning this year.

Red knots—which can live ten years or longer—are also relatively slow to breed: though the 6-week-old chicks will flutter south after the brief Arctic summer, they won't be ready to migrate north and mate for two years.

There are also myriad dangers outside the bay area, which, after all, is just a tiny portion of the territory these birds cover. The knots are vulnerable to oil spills, late snowmelts in the Arctic and even lemming population trends; if the lemmings die off, northern predators devour shorebird chicks instead. "If everything's great in Delaware, something awful can happen in the Arctic," Clark said. But all these potential stresses make a reliable food supply at their main rest stop even more vital.

As tagging wrapped up, several military helicopters swooped low over the harbor. The birders wondered if the choppers were carrying dignitaries, maybe even the president, to Washington from nearby Dover Air Force base. This possibility did not diminish their outrage at the disturbance. Hundreds of birds that had resumed pecking nearby took off, making a soft rushing sound with their flickering wings, like wind through marsh grass.

They never came back. Or so it seemed. Few shorebirds resumed feeding on the point that morning, and later in the day volunteers checked all the usual beaches: no knots. Nor were birds sighted the next day, save a handful of portly stragglers. Unbeknownst to the birders, flocks had likely begun leaving the evening before the tagging, steadily flowing out of the region. This was a day and a half ahead of schedule: they had plumped up quickly.

It could be that the birds fared well simply because there were more horseshoe crab eggs to go around. Other shorebird populations have declined in recent years as well, freeing up even more eggs.

"We're not sure exactly why things went well this year," said Larry Niles, a biologist with the Conserve Wildlife Foundation of New Jersey. "Crab populations don't change that fast and neither do shorebirds." Still, he added, "it was really gratifying to watch the birds go off in good condition." And for days after the knots departed, crabs continued to crowd the shallows, waiting for the tide to change.

DAY OF RECKONING

ONE HUNDRED FIFTY YEARS AGO, ABOLITIONIST JOHN BROWN'S RAID ON A FEDERAL ARSENAL AT HARPERS FERRY PROPELLED THE NATION CLOSER TO CIVIL WAR

BY FERGUS M. BORDEWICH

Harpers Ferry, Virginia, lay sleeping on the night of October 16, 1859, as 19 heavily armed men stole down mist-shrouded bluffs along the Potomac River where it joins the Shenandoah. Their leader was a rail-thin 59-year-old man with a shock of graying hair and penetrating steel-gray eyes. His name was John Brown. Some of those who strode across a covered railway bridge from Maryland into Virginia were callow farm boys; others were seasoned veterans of the guerrilla war in disputed Kansas. Among them were Brown's youngest sons, Watson and Oliver; a fugitive slave from Charleston, South Carolina; an African-American student at Oberlin College; a pair of Quaker brothers from Iowa who had abandoned their pacifist beliefs to follow Brown; a former slave from Virginia; and men from Connecticut, New York, Pennsylvania and Indiana. They had come to Harpers Ferry to make war on slavery.

The raid that Sunday night would be the most daring instance on record of white men entering a Southern state to incite a slave rebellion. In military terms, it was barely a skirmish, but the incident electrified the nation. It also created, in John Brown, a figure who after a century and a half remains one of the most emotive touchstones of our racial history, lionized by some Americans and loathed by others: few are indifferent. Brown's mantle has been claimed by figures as diverse as Malcolm X, Timothy McVeigh, Socialist leader Eugene Debs and abortion protesters espousing violence. "Americans do not deliberate about John Brown—they *feel* him," says Dennis Frye, the National Park Service's chief historian at Harpers Ferry. "He is still alive today in the American soul. He represents something for each of us, but none of us is in agreement about what he means."

"The impact of Harpers Ferry quite literally transformed the nation," says Harvard historian John Stauffer, author of *The Black Hearts of Men: Radical Abolitionists and the Transformation of Race*. The tide of anger that flowed from Harpers Ferry traumatized Americans of all persuasions, terrorizing Southerners with the fear of massive slave rebellions, and radicalizing countless Northerners, who had hoped that violent confrontation over slavery could be indefinitely postponed. Before Harpers Ferry, leading politicians believed that the widening division between North and South would eventually yield to compromise. After it, the chasm appeared unbridgeable. Harpers Ferry splintered the Democratic Party, scrambled the leadership of the Republi-

GRANGER COLLECTION, NEW YORK

cans and produced the conditions that enabled Republican Abraham Lincoln to defeat two Democrats and a third-party candidate in the presidential election of 1860.

"Had John Brown's raid not occurred, it is very possible that the 1860 election would have been a regular two-party contest between antislavery Republicans and pro-slavery Democrats," says City University of New York historian David Reynolds, author of *John Brown: Abolitionist*. "The Democrats would probably have won, since Lincoln received just 40 percent of the popular vote, around one million votes less than his three opponents." While the Democrats split over slavery, Republican candidates such as William Seward were tarnished by their association with abolitionists; Lincoln, at the time, was regarded as one of his party's more conservative options. "John Brown was, in effect, a hammer that shattered Lincoln's opponents into fragments," says Reynolds. "Because Brown helped to disrupt the party system, Lincoln was carried to victory, which in turn led 11 states to secede from the Union. This in turn led to the Civil War."

Well into the 20th century, it was common to dismiss Brown as an irrational fanatic, or worse. In the rousing pro-Southern 1940 classic film *Santa Fe Trail*, actor Raymond Massey portrayed him as a wild-eyed madman. But the civil rights movement and a more thoughtful acknowledgment of the nation's racial problems have occasioned a more nuanced view. "Brown was thought mad because he crossed the line of permissible dissent," Stauffer says. "He was willing to sacrifice his life for the cause of blacks, and for this, in a culture that was simply marinated in racism, he was called mad."

Brown was a hard man, to be sure, "built for times of trouble and fitted to grapple with the flintiest hardships," in the words of his close friend, the African-American orator Frederick Douglass. Brown felt a profound and lifelong empathy with the plight of slaves. "He stood apart from every other white in the historical record in his ability to burst free from the power of racism," says Stauffer. "Blacks were among his

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Brown (opposite: c. 1856 and above: depicted with beard at Harpers Ferry) and many of his followers holed up in the fire engine house awaiting reinforcements by a swarm of "bees"—slaves from the surrounding area. But only a handful showed up.

Harpers Ferry, the site of a federal armory at the junction of the Potomac and Shenandoah rivers, was one of the most heavily industrialized towns in the South. Brown and his men stole into town after dark on October 16, 1859, 150 years ago this month.

closest friends, and in some respects he felt more comfortable around blacks than he did around whites."

Brown was born with the century, in 1800, in Connecticut, and raised by loving if strict parents who believed (as did many, if not most, in that era) that righteous punishment was an instrument of the divine. When he was a small boy, the Browns moved west in an ox-drawn wagon to the raw wilderness of frontier Ohio, settling in the town of Hudson, where they became known as friends to the rapidly diminishing population of Native Americans, and as abolitionists who were always ready to help fugitive slaves. Like many restless 19th-century Americans, Brown tried many professions, failing at some and succeeding modestly at others: farmer, tanner, surveyor, wool merchant. He married twice—his first wife died from illness—and, in all, fathered 20 children, almost half of whom died in infancy; 3 more would die in the war against slavery. Brown, whose beliefs were rooted in strict Calvinism, was convinced that he had been predestined to bring an end to slavery, which he believed with burning certitude was a sin against God. In his youth, both he and his father, Owen Brown, had served as "conductors" on the Underground Railroad. He had denounced racism within his

In the territory of Kansas (below left), abolitionists and slavery advocates fought over the issue of "popular sovereignty." In the U.S. Senate (below right), Massachusetts' Senator Charles Sumner was caned by a pro-slavery congressman from South Carolina.

LIBRARY OF CONGRESS; MAP: GUILBERT GATES; GRANGER COLLECTION, NEW YORK (2)

Dennis Frye (near the engine house, at right) is the Park Service's chief historian at Harpers Ferry. John Brown, he says, "is still alive today in the American soul. He represents something for each of us, but none of us is in agreement about what he means."

own church, where African-Americans were required to sit in the back, and shocked neighbors by dining with blacks and addressing them as "Mr." and "Mrs." Douglass once described Brown as a man who "though a white gentleman, is in sympathy, a black man, and as deeply interested in our cause, as though his own soul had been pierced with the iron of slavery."

In 1848, the wealthy abolitionist Gerrit Smith encouraged Brown and his family to live on land Smith had bestowed on black settlers in northern New York. Tucked away in the Adirondack Mountains, Brown concocted a plan to liberate slaves in numbers never before attempted: A "Subterranean Pass-Way"—the Underground Railroad writ large—would stretch south through the Allegheny and Appalachian mountains, linked by a chain of forts manned by armed abolitionists and free blacks. "These warriors would raid plantations and run fugitives north to Canada," says Stauffer. "The goal was to destroy the value of slave property." This scheme would form the template for the Harpers Ferry raid and, says Frye, under different circumstances "could have succeeded. [Brown] knew that he couldn't free four million people. But he understood economics and how much money was invested in slaves. There would be a panic—property values would dive. The slave economy would collapse."

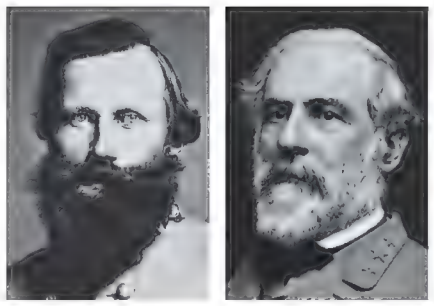
Neither Frederick Douglass (left) nor Harriet Tubman—both admirers—joined Brown's raid.

Political events of the 1850s turned Brown from a fierce, if essentially garden-variety, abolitionist into a man willing to take up arms, even die, for his cause. The Fugitive Slave Law of 1850, which imposed draconian penalties on anyone caught helping a runaway and required all citizens to cooperate in the capture of fugitive slaves, enraged Brown and other abolitionists. In 1854, another act of Congress pushed still more Northerners beyond their limits of tolerance. Under pressure from the South and its Democratic allies in the North, Congress opened the territories of Kansas and Nebraska to slavery under a concept called "popular sovereignty." The more northerly Nebraska was in little danger of becoming a slave state. Kansas, however, was up for grabs. Pro-slavery advocates—"the meanest and most desperate of men, armed to the teeth with Revolvers, Bowie Knives, Rifles & Cannon, while they are not only thoroughly organized, but under pay from Slaveholders," John Brown Jr. wrote to his father—poured into Kansas from Missouri. Antislavery settlers begged for guns and reinforcements. Among the thousands of abolitionists who left their farms, workshops or schools to respond to the call were John Brown and five of his sons. Brown himself arrived in Kansas in October 1855, driving a wagon loaded with rifles he had picked up in Ohio and Illinois, determined, he

BRENDAN SMIALOWSKI; GRANGER COLLECTION, NEW YORK; SYRACUSE NEWSPAPERS / DICK BLUME / THE IMAGE WORKS

said, "to help defeat Satan and his legions."

In May 1856, pro-slavery raiders sacked Lawrence, Kansas, in an orgy of burning and looting. Almost simultaneously, Brown learned that Charles Sumner of Massachusetts, the most outspoken abolitionist in the U.S. Senate, had been beaten senseless on the floor of the chamber by a cane-wielding congressman from South Carolina. Brown raged at the North's apparent helplessness. Advised to act with restraint, he retorted, "Caution, caution, sir. I am eternally tired of hearing the word caution. It is nothing but the word of cowardice." A party of Free-Staters led by Brown dragged five pro-slavery men out of their isolated cabins on eastern Kansas' Pottawatomie Creek and hacked them to death with cutlasses. The horrific nature of the murders disturbed even abolitionists. Brown was unrepentant. "God is my judge," he laconically replied when asked to account for his actions. Though he was a wanted man who hid out for a time, Brown eluded capture in the anarchic conditions that pervaded Kansas. Indeed, almost no one—pro-slavery or antislavery—was ever arraigned in a court for killings that took place during the guerrilla war there.



J.E.B. Stuart (above left) and Robert E. Lee both had roles in the Brown saga. Below, from top: Brown's sons Watson and Oliver were mortally wounded during the raid. John Kagi, Dangerfield Newby, Dauphin Thompson, Lewis Leary and William Thompson were killed during the raid; John Copeland surrendered; Osborne Anderson and Albert Hazlett escaped to Maryland.

The murders, however, ignited reprisals. Pro-slavery "border ruffians" raided Free-Staters' homesteads. Abolitionists fought back. Hamlets were burned, farms abandoned. Brown's son Frederick, who had participated in the Pottawatomie Creek massacre, was shot dead by a pro-slavery man. Although Brown survived many brushes with opponents, he seemed to sense his own fate. In August 1856 he told his son Jason, "I have only a short time to live—only one death to die, and I will die fighting for this cause."

By almost any definition, the Pottawatomie killings were a terrorist act, intended to sow fear in slavery's defenders. "Brown viewed slavery as a state of war against blacks—a system of torture, rape, oppression and murder—and saw himself as a soldier in the army of the Lord against slavery," says Reynolds. "Kansas was Brown's trial by fire, his initiation into violence, his preparation for real war," he says. "By 1859, when he raided Harpers Ferry, Brown was ready, in his own words, 'to take the war into Africa'—that is, into the South."

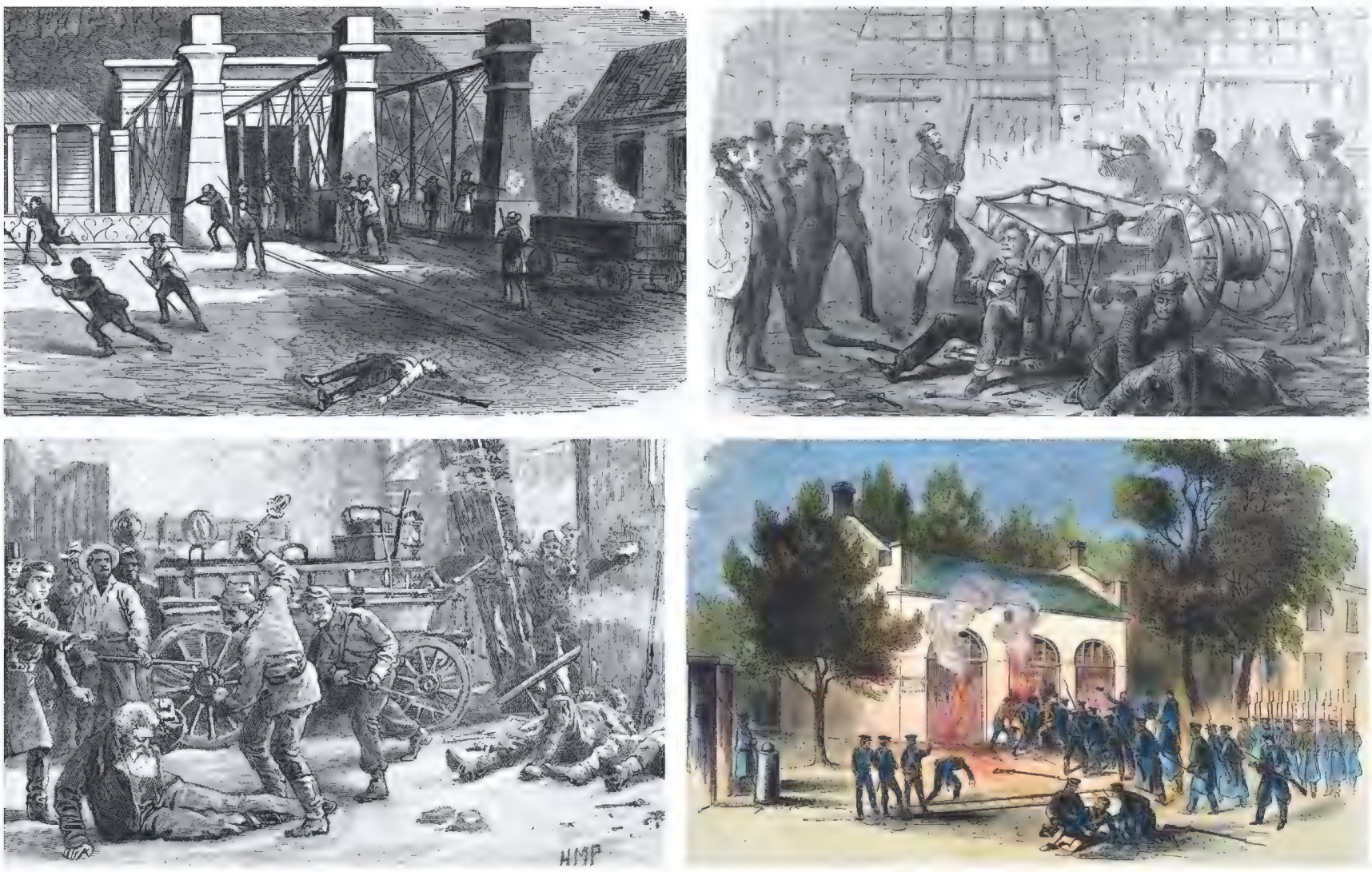
In January 1858, Brown left Kansas to seek support for his planned Southern invasion. In April, he sought out a diminutive former slave, Harriet Tubman, who had made eight secret trips to Maryland's Eastern Shore to lead dozens of slaves north to freedom. Brown was so impressed that he began referring to her as "General Tubman." For her part, she embraced Brown as one of the few whites she had ever met who shared her belief that antislavery work was a life-and-death struggle. "Tubman thought Brown was the greatest white man who ever lived," says Kate Clifford Larson, author of *Bound for the Promised Land: Harriet Tubman, Portrait of an American Hero*.

Having secured financial backing from wealthy abolitionists known as the "Secret Six," Brown returned to Kansas in mid-1858. In December, he led 12 fugitive slaves on an epic journey eastward, dodging pro-slavery guerrillas and marshals' posses and fighting and defeating a force of United States troops. Upon reaching Detroit, they were ferried across the Detroit River to Canada. Brown had covered nearly 1,500 miles in 82 days, proof to doubters, he felt sure, that he was capable of making the Subterranean Pass-Way a reality.

With his "Secret Six" war chest, Brown purchased hundreds of Sharps carbines and thousands of pikes, with which he planned to arm the first wave of slaves he expected to flock to his banner once he occupied Harpers Ferry. Many thousands more could then be armed with rifles stored at the federal arsenal there. "When I strike, the bees will swarm," Brown assured Frederick Douglass, whom he urged to sign on as president of a "Provisional Government." Brown also expected Tubman to help him recruit young men for his revolutionary army, and, says Larson, "to help infiltrate the countryside before the raid, encourage local blacks to join Brown and when the time came, to

FERGUS M. BORDEWICH, *a frequent contributor of articles on history, is profiled in the "From the Editor" column on page 3.*

GRANGER COLLECTION, NEW YORK; LIBRARY OF CONGRESS; GRANGER COLLECTION, NEW YORK (10)



Clockwise from top left: local forces quickly rallied to rout the raiders; Brown held about a dozen hostages in the engine house; U.S. Marines commanded by Robert E. Lee smashed through a door; Brown's belt buckle saved his life and made him a martyr.

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be at his side—like a soldier." Ultimately, neither Tubman nor Douglass participated in the raid. Douglass was sure the venture would fail. He warned Brown that he was "going into a perfect steel trap, and that he would not get out alive." Tubman may have concluded that if Brown's plan failed, the Underground Railroad would be destroyed, its routes, methods and participants exposed.

SIXTY-ONE MILES NORTHWEST of Washington, D.C., at the junction of the Potomac and Shenandoah rivers, Harpers Ferry was the site of a major federal armory, including a musket factory and rifle works, an arsenal, several large mills and an important railroad junction. "It was one of the most heavily industrialized towns south of the Mason-Dixon line," says Frye. "It was also a cosmopolitan town, with a lot of Irish and German immigrants, and even Yankees who worked in the industrial facilities." The town and its environs' population of 3,000 included about 300 African-Americans, evenly divided between slave and free. But more than 18,000 slaves—the "bees" Brown expected to swarm—lived in the surrounding counties.

As his men stepped off the railway bridge into town that October night in 1859, Brown dispatched contingents to seize the musket factory, rifle works, arsenal and adjacent brick fire-engine house. (Three men remained in Maryland to guard weapons that Brown hoped to distribute to slaves who joined him.) "I want to free all the negroes in this state," he told one of his first hostages, a night watchman. "If the citizens interfere with me, I must only burn the town and have blood." Guards were posted at the bridges. Telegraph lines were cut. The railroad station was seized. It was there that the raid's first casualty occurred, when a porter, a free black man named Hayward Shepherd, challenged Brown's men and was shot dead in the dark. Once key locations had been secured, Brown sent a detachment to seize several prominent local slave owners, including Col. Lewis W. Washington, a great-grandnephew of the first president.

Early reports claimed that Harpers Ferry had been taken by 50, then 150, then 200 white "insurrectionists" and "six hundred runaway negroes." Brown expected to have 1,500 men under his command by midday Monday. He later said he believed that he would eventually have armed as many as 5,000 slaves. But the bees did not swarm. (Only a handful of slaves lent Brown assistance.) Instead, as Brown's band watched dawn break over the craggy ridges enclosing Harpers Ferry, local white militias—similar to today's National Guard—were hastening to arms.

First to arrive were the Jefferson Guards, from nearby Charles Town. Uniformed in blue, with tall black Mexican War-era shakos on their heads and brandishing .58-caliber rifles, they seized the railway bridge, killing a former slave named Dangerfield Newby and cutting Brown off from his route of escape. Newby had gone north in a failed attempt to earn enough money to buy freedom for his wife and six children. In his pocket was a letter from his wife: "It is said

Master is in want of money," she had written. "I know not what time he may sell me, and then all my bright hopes of the future are blasted, for their [sic] has been one bright hope to cheer me in all my troubles, that is to be with you."

As the day progressed, armed units poured in from Frederick, Maryland; Martinsburg and Shepherdstown, Virginia; and elsewhere. Brown and his raiders were soon surrounded. He and a dozen of his men held out in the engine house, a small but formidable brick building, with stout oak doors in front. Other small groups remained holed up in the musket factory and rifle works. Acknowledging their increasingly dire predicament, Brown sent out New Yorker William Thompson, bearing a white flag, to propose a cease-fire. But Thompson was captured and held in the Galt House, a local hotel. Brown then dispatched his son, Watson, 24, and ex-cavalryman Aaron Stevens, also under a white flag, but the militiamen shot them down in the street. Watson, although fatally wounded, managed to crawl back to the engine house. Stevens, shot four times, was arrested.

When the militia stormed the rifle works, the three men inside dashed for the shallow Shenandoah, hoping to wade across. Two of them—John Kagi, vice president of Brown's provisional government, and Lewis Leary, an African-American—were shot dead in the water. The black Oberlin student, John Copeland, reached a rock in the middle of the river, where he threw down his gun and surrendered. Twenty-year-old William Leeman slipped out of the engine house, hoping to make contact with the three men Brown had left as backup in Maryland. Leeman plunged into the Potomac and swam for his life. Trapped on an islet, he was shot dead as he tried to surrender. Throughout the afternoon, bystanders took potshots at his body.

Through loopholes—small openings through which guns could be fired—that they had drilled in the engine house's thick doors, Brown's men tried to pick off their attackers, without much success. One of their shots, however, killed the town's mayor, Fontaine Beckham, enraging the local citizenry. "The anger at that moment was uncontrollable," says Frye. "A tornado of rage swept over them." A vengeful mob pushed its way into the Galt House, where William Thompson was being held prisoner. They dragged him onto the railroad trestle, shot him in the head as he begged for his life and tossed him over the railing into the Potomac.

By nightfall, conditions inside the engine house had grown desperate. Brown's men had not eaten for more than 24 hours. Only four remained unwounded. The bloody corpses of slain raiders, including Brown's 20-year-old son, Oliver, lay at their feet. They knew there was no hope of escape. Eleven white hostages and two or three of their slaves were pressed against the back wall, utterly terrified. Two pumpers and hose carts were pushed against the doors, to brace against an assault expected at any moment. Yet if Brown felt defeated, he didn't show it. As his son Watson writhed in agony, Brown told him to die "as becomes a man."

Soon perhaps a thousand men—many uniformed and disciplined, others drunk and brandishing weapons from shotguns to old muskets—would fill the narrow lanes of Harpers Ferry, surrounding Brown's tiny band. President James Buchanan had dispatched a company of Marines from Washington, under the command of one of the Army's most promising officers: Lt. Col. Robert E. Lee. Himself a slave owner, Lee had only disdain for abolitionists, who "he believed were exacerbating tensions by agitating among slaves and angering masters," says Elizabeth Brown Pryor, author of *Reading the Man: A Portrait of Robert E. Lee Through His Private Letters.* "He held that although slavery was regrettable, it was an institution sanctioned by God and as such would disappear only when God ordained it." Dressed in civilian clothes, Lee reached Harpers Ferry around midnight. He gathered the 90 Marines behind a nearby warehouse and worked out a plan of attack. In the predawn darkness, Lee's aide, a flamboyant young cavalry lieutenant, boldly approached the engine house, carrying a white flag. He was met at the door by Brown, who asked that he and his men be allowed to retreat across the river to Maryland, where they would free their hostages. The soldier promised only that the raiders would be protected from the mob and put on trial. "Well, lieutenant, I see we can't agree," replied Brown. The lieutenant stepped aside, and with his hand gave a prearranged signal to attack. Brown could have shot him dead—"just as easily as I could kill a musquito," he recalled later. Had he done so, the course of the Civil War might have been different. The lieutenant was J.E.B. Stuart, who would go on to serve brilliantly as Lee's cavalry commander.

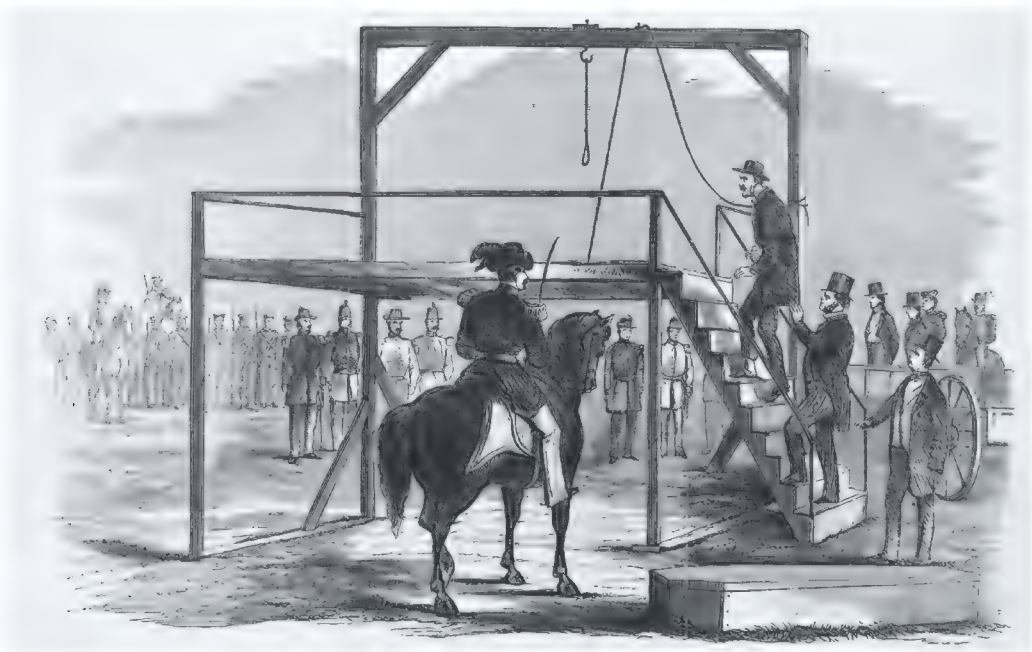
Brown's trial lasted six days. He was charged with three capital crimes: treason, murder and "conspiring with Negroes to produce insurrection."

Lee first sent several men crawling below the loopholes, to smash the door with sledgehammers. When that failed,

CORBIS

Watch a video to learn more about John Brown at Smithsonian.com/brown

a larger party charged the weakened door, using a ladder as a battering ram, punching through on their second try. Lt. Israel Green squirmed through the hole to find himself beneath one of the pumpers. According to Frye, as Green emerged into the darkened room, one of the hostages pointed at Brown. The abolitionist turned just as Green lunged forward with his saber, striking Brown in the gut with what should have been a death blow. Brown fell, stunned but astonishingly unharmed: the sword had struck a buckle and bent itself double. With the sword's hilt, Green then hammered Brown's skull until he passed out. Although severely injured, Brown would survive. "History may be a matter of a quarter of an inch," says Frye. "If the blade had struck a quarter inch to the left or right, up or down, Brown would have been a corpse, and there would have been no story for him to tell, and there would have been no martyr."



At the gallows, Brown told a guard, "Don't keep me waiting. . . . Be quick." Those would be his last words, though his deeds still reverberate today.

Meanwhile, the Marines poured through the breach. Brown's men were overwhelmed. One Marine impaled Indianan Jeremiah Anderson against a wall. Another bayoneted young Dauphin Thompson, where he lay under a fire engine. It was over in less than three minutes. Of the 19 men who strode into Harpers Ferry less than 36 hours before, five were now prisoners; ten had been killed or fatally injured. Four townspeople had also died; more than a dozen militiamen were wounded.

Only two of Brown's men escaped the siege. Amid the commotion, Osborne Anderson and Albert Hazlett slipped out the back of the armory, climbed a wall and scuttled behind the embankment of the Baltimore and Ohio Railroad to the bank of the Potomac, where they found a boat and paddled to the Maryland shore. Hazlett and another of the men whom Brown had left behind to guard supplies were later captured in Pennsylvania and extradited to Virginia. Of the total, five members of the raiding party would eventually make their way to safety in the North or Canada.

Brown and his captured men were charged with treason, first-degree murder and "conspiring with Negroes to produce insurrection." All of the charges carried the death penalty. The trial, held in Charles Town, Virginia, began on October 26; the verdict was guilty, and Brown was sentenced on November 2. Brown met his death stoically on the morning of December 2, 1859. He was led out of the Charles Town jail, where he had been held since his capture, and seated on a small wagon carrying a white pine coffin. He handed a note to one of his guards: "I John Brown am now quite certain that the crimes of this guilty land: will never be purged away; but with blood." Escorted by six companies of infantry, he was transported to a scaffold where, at 11:15, a sack was placed over his head and a rope fitted around his neck. Brown told his guard, "Don't keep me waiting longer than necessary. Be quick." These were his last words. Among the witnesses to his death were Robert E. Lee and two other men whose lives would be irrevocably changed by the events at Harpers Ferry. One was a Presbyterian professor from the Virginia Military Institute, Thomas J. Jackson, who would earn the nickname "Stonewall" less than two years later at the Battle of Bull Run. The other was a young actor with seductive eyes and curly hair, already a fanatical believer in Southern nationalism: John Wilkes Booth. The remaining convicted raiders would be hanged, one by one.

Brown's death stirred blood in the North and the South for opposing reasons. "We shall be a thousand times more Anti-Slavery than we ever dared to think of being before," proclaimed the *Newburyport* (Massachusetts) *Herald*. "Some eighteen hundred years ago Christ was crucified," Henry David Thoreau opined in a speech in Concord on the day of Brown's execution, "This morning, perchance, Captain Brown was hung. These are the two ends of a chain which is not without its links. He is not Old Brown any longer; he is an angel of light." In 1861, Yankee soldiers would march to battle singing: "John Brown's body lies a-mouldering in the grave, but his soul goes marching on."

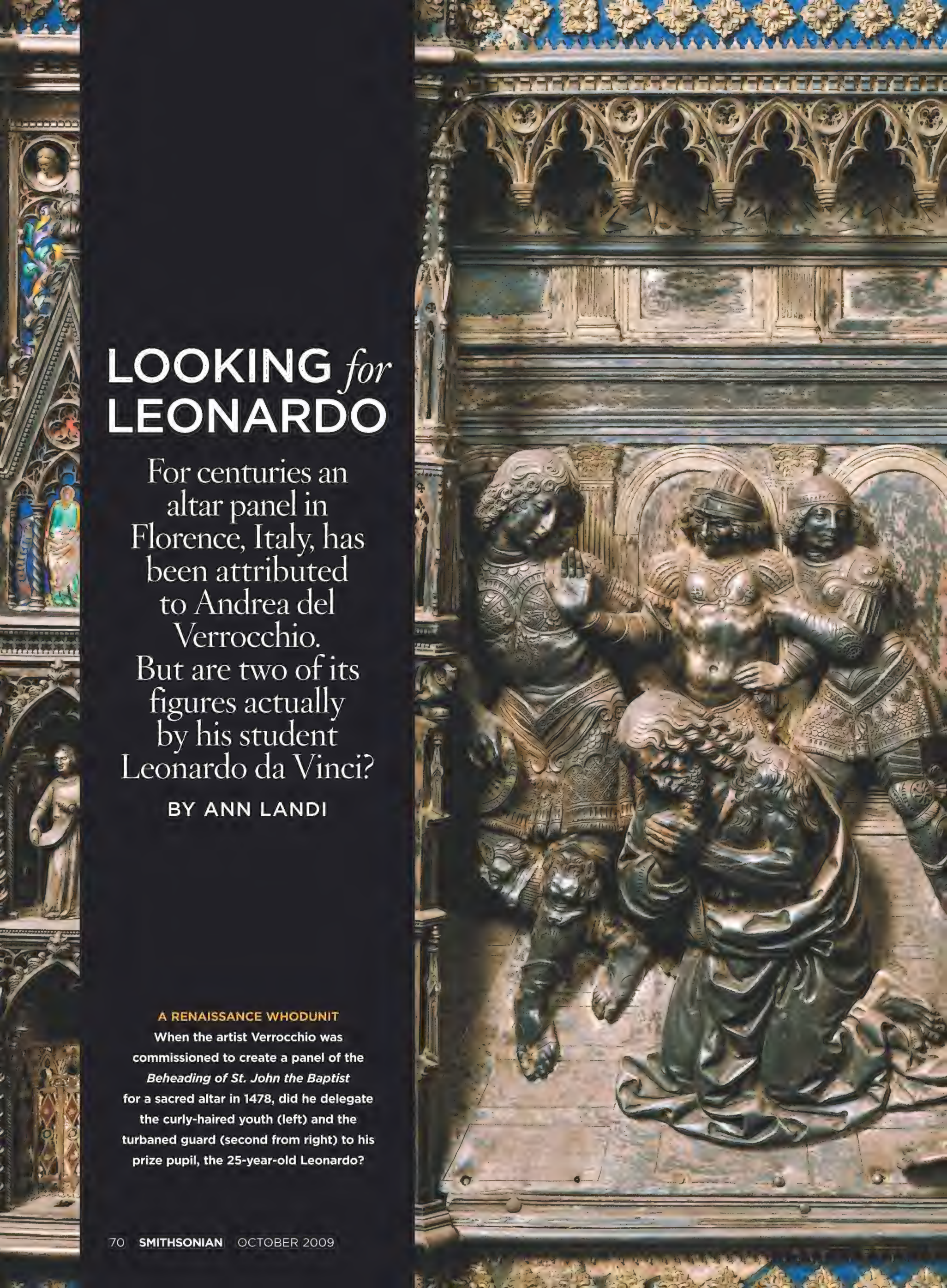
On the other side of the Mason-Dixon line, "this was the South's Pearl Harbor, its ground zero," says Frye. "There was a heightened sense of paranoia, a fear of more abolitionist attacks—that more Browns were coming any day, at any moment. The South's greatest fear was slave insurrection. They all knew that if you held four million people in bondage, you're vulnerable to attack." Militias sprang up across the South. In town after town, units organized, armed and drilled. When war broke out in 1861, they would provide the Confederacy with tens of thousands of well-trained soldiers. "In effect, 18 months before Fort Sumter, the South was already declaring war against the North," says Frye. "Brown gave them the unifying momentum they needed, a common cause based on preserving the chains of slavery."

LIBRARY OF CONGRESS

LOOKING *for* LEONARDO

For centuries an altar panel in Florence, Italy, has been attributed to Andrea del Verrocchio. But are two of its figures actually by his student Leonardo da Vinci?

BY ANN LANDI



A RENAISSANCE WHODUNIT

When the artist Verrocchio was commissioned to create a panel of the *Beheading of St. John the Baptist* for a sacred altar in 1478, did he delegate the curly-haired youth (left) and the turbaned guard (second from right) to his prize pupil, the 25-year-old Leonardo?

TWO LEONARDOS?

The silver altar panel figures, curator Radke points out, were created separately from the frieze background, allowing for a master-student collaboration. When he examined them after a 21st-century cleaning, Radke noticed that two figures (above and opposite) shared naturalistic elements of modeling and detail "markedly absent from the rest."

There's nothing unusual about discoveries of lost works by Leonardo da Vinci. Every few months, it seems, a story hits the news that yet another "Leonardo" has been unearthed—the lost fresco of the *Battle of Anghiari*, a terra-cotta bust discovered in the attic of a 14th-century palazzo, or a self-portrait embedded in the spidery script of one of his notebooks. A recent television documentary even made a claim for the artist's authorship of the Shroud of Turin.

Leonardo scholar Martin Kemp, emeritus professor of art history at Oxford University, calls the perpetrators of such dubious attributions "Leonardo loonies" and says he gets "bombarded" with them almost daily.

What is exceedingly rare, however, is for a noted Renaissance scholar to bring forth evidence, patiently argued and carefully annotated, that a work previously thought to be by a lesser light is actually an effort by the young Leonardo. That is the case with Gary M. Radke's recent announcement that two silver figures, from a 12 1/8-inch by 16 1/2-inch altar panel made for the Baptistery in Florence, Italy, were more likely created by Leonardo than by his teacher, Andrea del Verrocchio.

The two figures in question, an angelic-looking youth holding a salver at the far left of the relief and a fierce, turbaned warrior, second from right, stand out from the others in the scene for their greater expressiveness and naturalistic detail—the way things move and react to the elements. Both qualities are hallmarks of Leonardo's work. Take the epaulets on the two soldiers on the right of the panel, says Radke. On Verrocchio's helmeted figure they are stiff and rigidly patterned, while on the turbaned soldier they appear to ripple as if in response to the figure's

PP. 70-71, 72 MUSEO DELL'OPERA DEL DUOMO, FLORENCE. PHOTO: ANTONIO QUATTRONE, 2009

movements. Or the hair, which curls on both "Leonardo" figures according to the laws of nature instead of falling into predictable ringlets. A comparison of the reverse side of the relief's sculptures—never meant to be seen—shows the artist paying attention to how a leather skirt might fall instead of fashioning a cursory swath like Verrocchio's. (Leonardo fans can judge for themselves when the work is shown in the exhibition "Leonardo da Vinci: Hand of the Genius," curated by Radke, at Atlanta's High Museum, for four months beginning October 6.)

TEACHER'S PET

After a decade with Verrocchio, Leonardo (a likely portrait by Francesco Melzi c. 1510) began his professional career in 1478.

Radke, Dean's Professor of the Humanities at Syracuse University, had known about the panel, which depicts the beheading of John the Baptist, since an undergraduate sojourn in Florence in 1972, but it took an encounter with the recently cleaned work at an exhibition at that city's Palazzo Medici in December 2007 to provoke the "aha!" moment.

What also swayed Radke was a drawing securely attributed to Leonardo in the British Museum, the silverpoint *Head of a Warrior* from the mid-1470s, roughly the same date as the altar panel (1478). "It was just so spectacularly competent in terms of the medium, and every single detail was more alive and more filled with naturalistic observation than I had ever imagined from the reproduction,"

CLUES IN THE EPAULETS **The fluid movement of the fringed epaulets of the turbaned guard (above right) is more expressive than the rigid, linear patterning of those on Verrocchio's helmeted soldier (above left). In addition, says Radke, they echo a known Leonardo drawing of a warrior.**

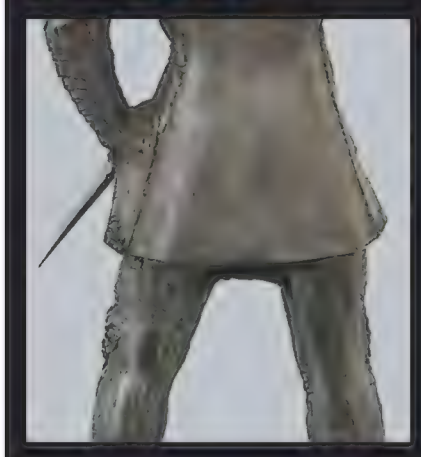
ROYAL LIBRARY, WINDSOR; MUSEO DELL'OPERA DEL DUOMO, FLORENCE. PHOTO: ANTONIO QUATTRONE, 2009 (3)

VERROCCHIO

LEONARDO?

THE WAY THE SKIRT SWISHES Consistency and scale distinguish the two artists: the number of scalloped rows varies from three to two to four across Verrocchio's skirt, while the minute attention to detail on the other suggests an artist with a greater interest in complete naturalism.

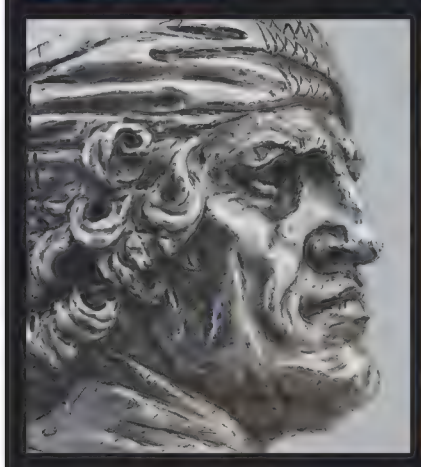
VERROCCHIO



LEONARDO?

OUT OF SIGHT, OUT OF MIND The figures were worked individually from the front, and then attached to the background. The Verrocchio figures have simple sheets of silver on their backs, while the turbaned guard is "highly expressive and coherent from the rear," writes Radke.

LEONARDO?



LEONARDO

ON THE FACE OF IT "The turbaned officer possesses the same self-awareness and psychological intensity as the warrior in Leonardo's drawing [*Head of a Warrior*, c. 1475]," writes Radke, who notes the sagging skin in both is more realistically time-ravaged than in Verrocchio's work.

Read about another Leonardo mystery at Smithsonian.com/davinci

he says. A simple comparison of the jowls in Leonardo's drawing with those in Verrocchio's figures reveals an attention to middle-aged skin that is foreign to the teacher.

The illegitimate son of a notary, Leonardo was born in 1452 in the tiny town of Vinci, some 40 miles west of Florence. "We really don't know what his youth was like, other than he was out in the countryside," Radke says. "He must have spent a lot of time observing the world around him." According to the 16th-century biographer Giorgio Vasari, Leonardo was said to have shown an early artistic talent and, as a youth, painted a shield depicting a smoke-breathing creature made up of various animal parts put together "in so strange a fashion that it appeared altogether a monstrous and horrible thing." Radke observes that the boy probably did not get as much formal education in rural Vinci as he would have gotten in cosmopolitan Florence. Instead, he says, "Leonardo seems to have been freer to look at the world with fresh eyes. Nature was his primary teacher."

Andrea del Verrocchio was a leading sculptor, painter

"Leonardo seems to have been freer to look at the world with fresh eyes. Nature was his primary teacher," says Radke.

and goldsmith of his day. The head of a busy workshop in Florence, he is known for his bronze *David*. Leonardo entered Verrocchio's workshop in his teens, placed there, Radke speculates, because his father may have had connections with the Medici, the city's greatest art patrons. The young man served a long apprenticeship, at least a decade, and by the early 1480s was presenting himself to the Duke of Milan as a master of painting and sculpture as well as a formidable military engineer.

Documentary evidence suggests that Leonardo worked on many sculptural projects, even completing a 24-foot-tall clay model for a bronze horse, but none has survived. (Neither Radke nor Kemp has seen the terra-cotta bust in the palazzo in person, but both doubt the attribution. It lacks "the attention to naturalistic details I associate with Leonardo," says Radke.) The Baptistery figures, if accepted as Leonardo's, would be the only extant sculptures made in the artist's lifetime (a sculpture of a horse, thought to have been cast from a lost model after his death, is in the exhibition). Making an attribution stick when there's little with which to compare a work and when there is no paper trail—a bill of sale, preparatory sketches, a reference in a letter—is not easy.

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MUSEO DELL'OPERA DEL DUOMO, FLORENCE. PHOTO: ANTONIO QUATTRONE, 2009 (5); BRITISH MUSEUM / BRIDGEMAN ART LIBRARY INTERNATIONAL

Renaissance studies are littered with bad judgments and outright scandal. Attributions by the scholar Bernard Berenson, who died in 1959, have been overturned (and there have been allegations that Berenson colluded with art dealers for his own profit). In 1987, Frederick Hartt, an authority on Renaissance sculpture at the University of Virginia, pronounced as genuine a small plaster study for Michelangelo's *David* in which, it turned out, he had a financial interest. Few scholars have seen the statue, which is in a bank vault until litigation is resolved, and the attribution remains in limbo. In 1995, New York University art historian Kathleen Weil-Garris Brandt announced she had discovered a marble statue by the youthful Michelangelo, hidden in plain sight at the French Embassy's cultural offices in New York City. Several experts quickly repudiated the claim and current opinion remains divided. (*Young Archer*, as the statue is known, will go on exhibition in November as an object lesson in the challenge of attribution, at the Metropolitan Museum of Art in Manhattan.)

Aware of such controversies, Radke has proceeded with careful deliberation. In October 2008, he presented his thesis about the silver figures to colleagues at the Provo/Athens Renaissance Sculpture Conference, a quadrennial meeting of experts. Some were convinced, some not. "My main hesitation is to attach big names to works of art about which we know very little in terms of how the workshops in which they were produced functioned," says Sally Cornelison, associate professor of Italian Renaissance art at the University of Kansas. "I'm not going to say that it's not Leonardo, but I think we need to be cautious. We don't know that much about people who worked as goldsmiths and silversmiths during the Renaissance. It could just as easily be by an extremely capable but unknown artisan."

THE MAN WHO SAW **Although Radke (at Syracuse in 2009) admits to some anxiety about anticipated reaction to his Leonardo attribution, "trying to listen to the questions and reservations in the end gets us closer to what was happening."**

Martin Kemp, who did not attend the conference, is inclined to accept Radke's attribution on the basis of photographic evidence and the way the two "Leonardo" figures reflect light. Leonardo's handling of light was always more "painterly" and sensitive to the nuances of surface, he says, while Verrocchio tended toward the blunt and the sculptural. "What is absolutely right is that there are different hands and eyes at work in that panel," Kemp adds, but he speculates they might be Verrocchio's in the "Leonardo" figures and a lesser assistant elsewhere. Or was there another apprentice as talented as the young Leonardo?

As Radke himself notes, no contemporary attributions to a Leonardo sculpture have won unqualified acceptance. "I believe that until we discover some new written documents or other evidence, neither will the two figures in the silver altar," he says. "But what can one expect in a situation where no documented work has survived? That said, I do believe that there is more visual evidence for my attribution than any previously proposed."

AMY TOENSING / REPORTAGE BY GETTY IMAGES

OUT OF THIS WORL

In the past decade, extraordinary space missions have charted flares on the Sun, detected magnetic storms on Mercury and found volcanoes on Saturn's moons

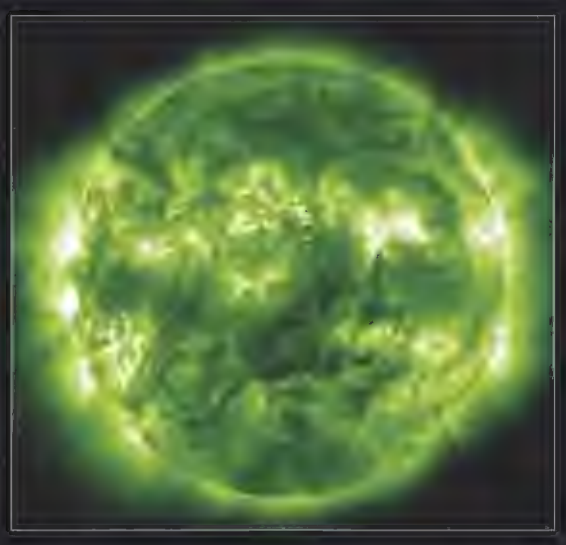
BY LAURA HELMUTH

WE'VE BEEN LOOKING at other planets through telescopes for four centuries. But if you really want to get to know a place, there's no substitute for being there. And in the past decade, more than 20 spacecraft have ventured into the deepest reaches of our solar system. These probes, unlike the Hubble Space Telescope and other observatories that merely orbit Earth, have actually traveled to other planets and approached the Sun, sending back pictures that humble or awe, even as they advance astronomers' understanding of our corner of the universe.

"The past decade has been spectacular in terms of achievements," says Sean Solomon, an astronomer at the Carnegie Institution of Washington and a leader of recent missions to Mercury and Mars.

Seven missions are currently keeping a wary eye on the Sun; they were launched by the United States, Japan and Europe, partly for pure science and partly for self-preservation. Solar flares, which can come from sunspots, are magnetic eruptions that sometimes hit Earth. A superflare like the one in 1859 that surged through telegraph lines and ignited fires would black out today's electrical grids, fry communication satellites and jam navigation signals. Missions to track solar flares may alert us to outsize magnetic storms in time to brace ourselves.

Last year, NASA's Messenger mission gave us the first up-close view of parts of Mercury, the planet closest to the Sun. The spacecraft has found extensive ridges along the planet's surface, made as it cooled and shrank over its four billion years. Messenger should nestle into orbit around Mercury in 2011 and continue to study the planet's geology and magnetic fields.



The Sun erupts in flares (above, as seen through a SOHO ultraviolet telescope) and "prominences." Right: relative to this image from the SOHO satellite, Earth would be the size of an aspirin.

SOHO / ESA & NASA (2)

More missions—19 successful ones since the 1960s—have made it to Mars than any other planet, and it's the only planet whose surface we've explored with robots. NASA's Sojourner rover rolled along for three months in 1997; Phoenix performed direct experiments on soil samples during five months last year. The superstars of planetary exploration, the Spirit and Opportunity rovers, are still analyzing the Martian surface after five years. Thanks to all these efforts, we now know that Mars

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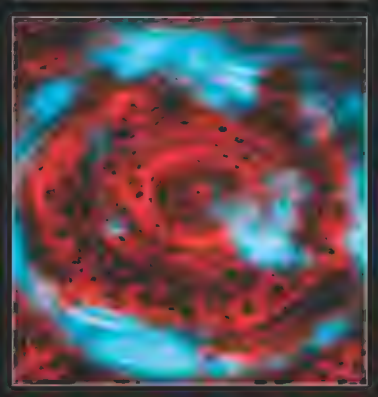
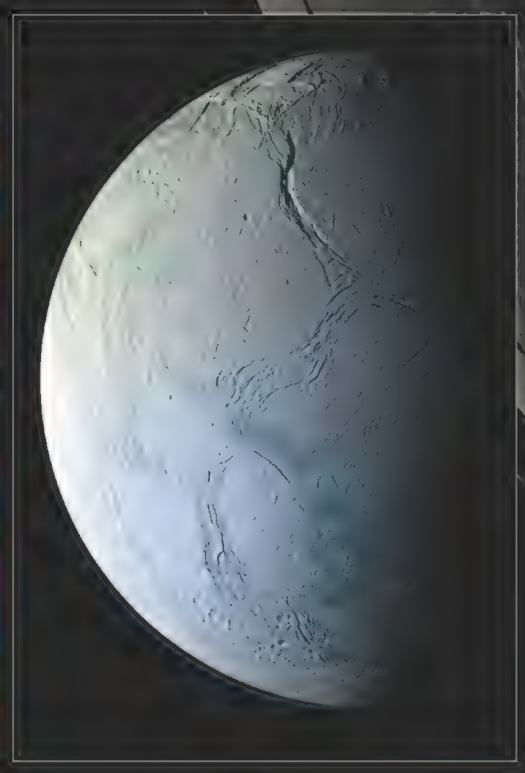
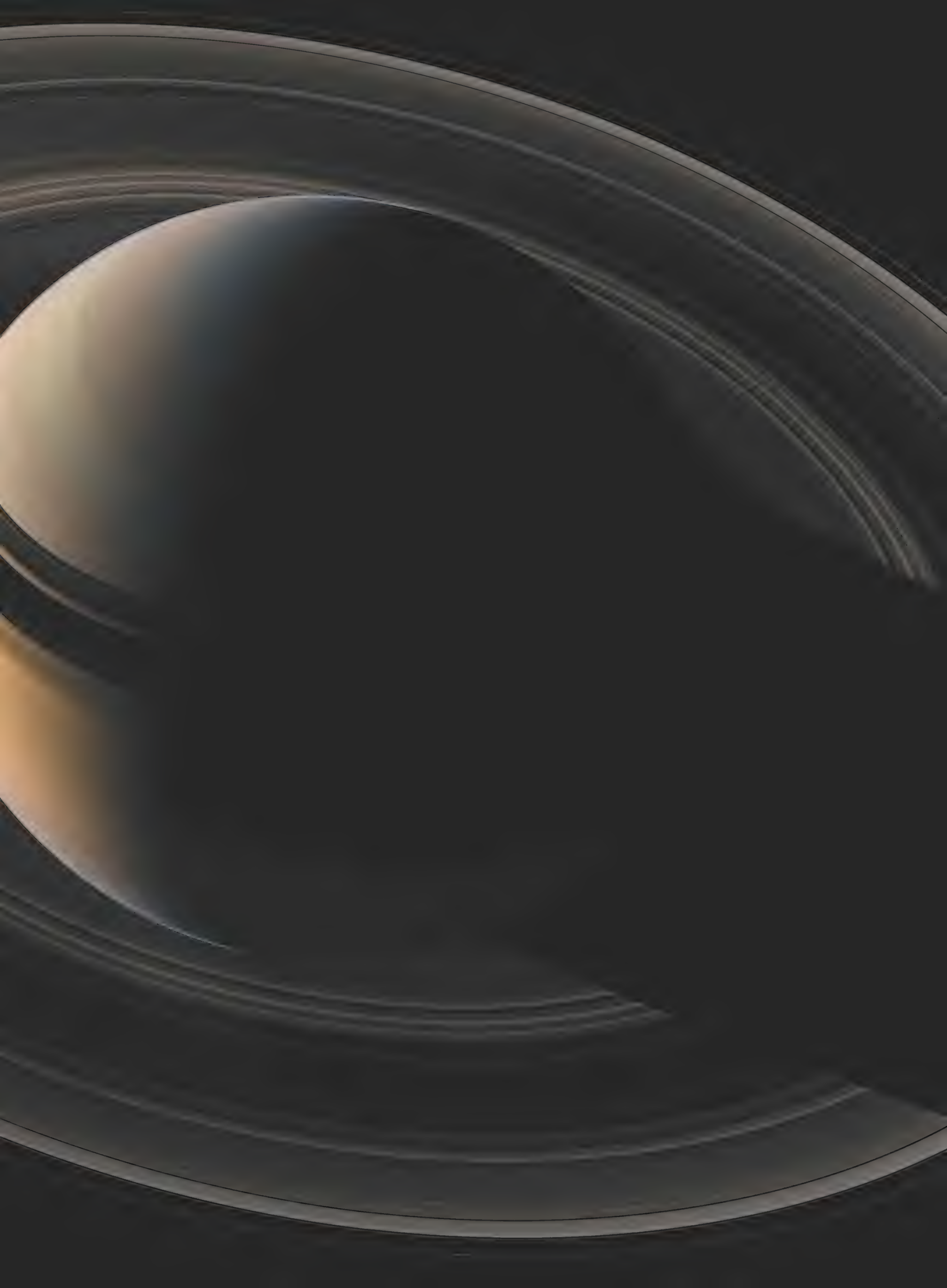
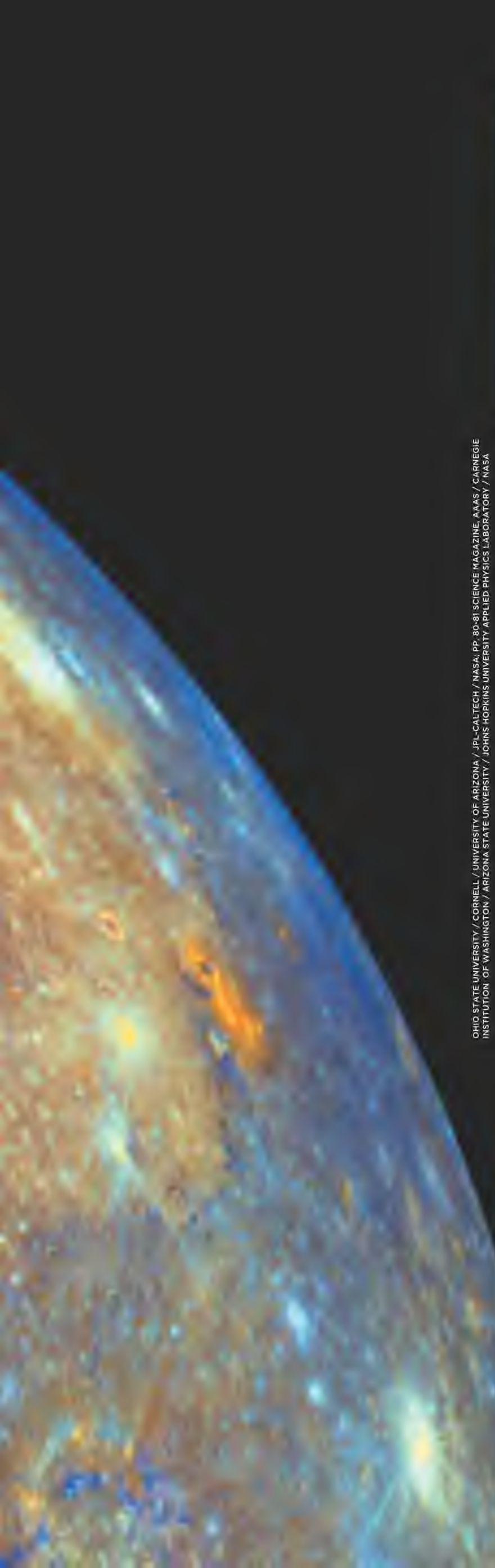




JPL / NASA; SPACE SCIENCE INSTITUTE / JPL / NASA; UNIVERSITY OF ARIZONA / JPL / NASA; PP. 78–79 SPACE SCIENCE INSTITUTE / JPL / NASA

Aside from its solid core, Saturn (right: from the Cassini mission) is mostly hydrogen and helium. The gas giant hosts lightning, wind and clouds of ammonia and water. Insets, clockwise from top left: On Jupiter's moon Io, volcanoes spew sulfur; cracks and folds on the ice-covered Saturnian moon Enceladus betray tectonic activity, hinting at liquid water beneath the surface; charged solar particles flow along Saturn's magnetic field to its poles, generating a display (in infrared) akin to Earth's northern lights.





More than three billion years ago, Mercury (as viewed from Messenger) was slammed by an asteroid or comet that created the Caloris Basin (the vast golden area). Volcanoes (in orange) erupted at the crater's edges. Inset, left: At Victoria Crater on Mars (as photographed from the Mars Reconnaissance Orbiter), the rover Opportunity examined samples of sedimentary rock.

OHIO STATE UNIVERSITY / CORNELL / UNIVERSITY OF ARIZONA / JPL-CALTECH / NASA; PP. 80-81 SCIENCE MAGAZINE, AAAS / CARNEGIE INSTITUTION OF WASHINGTON / ARIZONA STATE UNIVERSITY / JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY / NASA

once had seas and rivers and there's ice there today. In the nine years before it went silent in 2006, the Mars Global Surveyor satellite detected many changes in the red planet, including the formation of two gullies, apparently by gushes of liquid water.

NASA's Galileo mission, focusing on the four Jovian moons that the Italian astronomer himself discovered 400 years ago, observed an atmosphere on Europa, ice at the poles and possibly an underground ocean. Callisto, too, may have a liquid ocean. Ganymede has a magnetic field, and Io sizzles with lava that reaches 3,140 degrees Fahrenheit. After the spacecraft ran out of fuel in 2003, engineers sent it crashing into Jupiter. Galileo went out in a blaze of observations.

For breathtaking beauty, no mission can compete with Cassini, which is run by the United States with contributions from 16 other nations. Zipping around Saturn and its moons since 2004, Cassini has detected odd spirals in Saturn's rings and a surprising amount of geologic activity on its moons. Titan, the largest (bigger even than Mercury), has lakes of supercool methane and slushy eruptions of a water-ammonia mix. Enceladus is riddled with geysers so powerful they feed matter into Saturn's rings. Rhea may have its *own* rings. Saturn is practically a solar system unto itself.

Pluto may not officially count as a planet anymore, but it has its own mission: NASA's New Horizons, now en route and expected to arrive in 2015.

LAURA HELMUTH *is a senior editor at* SMITHSONIAN.

Explore more photographs of the planets at Smithsonian.com/solarsystem

A World Too New

The European discovery of America opened possibilities for those with eyes to see. But Columbus was not one of them **BY EDMUND S. MORGAN**

IN THE YEAR 1513, a group of men led by Vasco Núñez de Balboa marched across the Isthmus of Panama and discovered the Pacific Ocean. They had been looking for it—they knew it existed—and, familiar as they were with oceans, they had no difficulty in recognizing it when they saw it. On their way, however, they saw a good many things they had not been looking for and were not familiar with. When they returned to Spain to tell what they had seen, it was not a simple matter to find words for everything.

For example, they had killed a large and ferocious wild animal. They called it a tiger, although there were no tigers in Spain and none of the men had ever seen one before. Listening to their story was Peter Martyr, member of the King's Council of the Indies and possessor of an insatiable curiosity about the new land that Spain was uncovering in the west. How, the learned man asked them, did they know that the ferocious animal was a tiger? They answered "that they knewe it by the spottes, fiercenesse, agilitie, and such other markes and tokens whereby auncient writers have described the Tyger." It was a good answer. Men, confronted with things they do not recognize, turn to the writings of those who have had a wider experience. And in 1513 it was still assumed that the ancient writers had had a wider experience than those who came after them.

Columbus himself had made that assumption. His discoveries posed for him, as for others, a problem of identification. It seemed to be a question not so much of giving names to new lands as of finding the proper old names, and the same was true of the things that the new lands contained. Cruising through the Caribbean, enchanted by the beauty and variety of what he saw, Columbus assumed that the strange plants and trees were strange only because he was insufficiently versed in the writings of men who did know them. "I am the saddest man in the world," he wrote, "because I do not recognize them."

We need not deride Columbus' reluctance to give up the world that he knew from books. Only idiots escape entirely from the world that the past bequeaths. The discovery of America opened a new world, full of new things and new possibilities for those with eyes to see them. But the New World did not erase the Old. Rather, the Old World determined what men saw in the New and what they did with it. What America became after 1492 depended both on what men found there and on what they expected to find, both on what America actually was and on what old writers and old experience

Columbus (in a c. 1594 engraving) carried ideas that boded ill for Indies natives.

THEODOR DE BRY / GRANGER COLLECTION, NEW YORK

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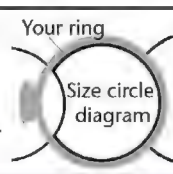

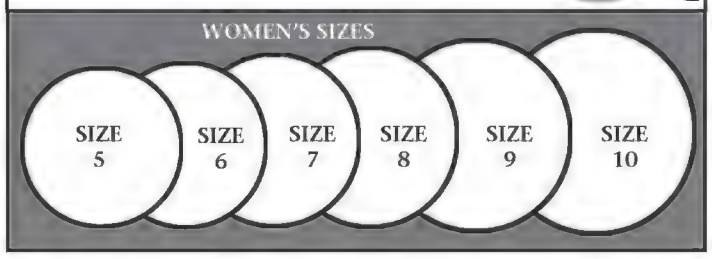

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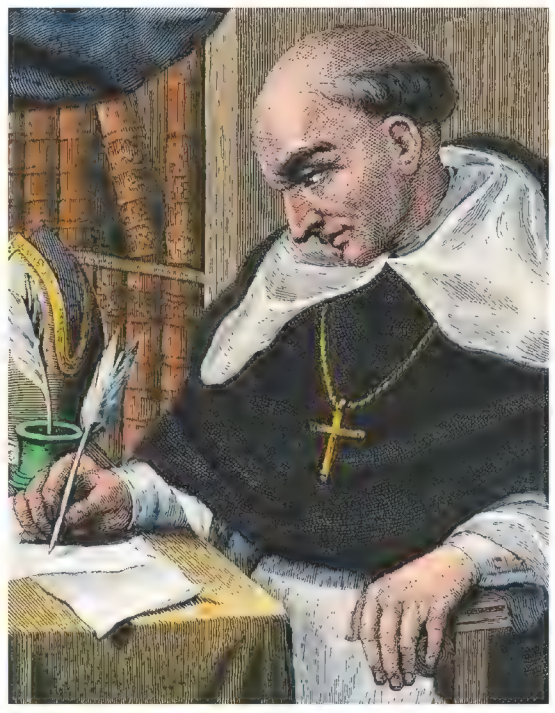
led men to think it was, or ought to be or could be made to be.

DURING THE DECADE before 1492, as Columbus nursed a growing urge to sail west to the Indies—as the lands of China, Japan and India were then known in Europe—he was studying the old writers to find out what the world and its people were like. He read the *Ymago Mundi* of Pierre d'Ailly, a French cardinal who wrote in the early 15th century, the travels of Marco Polo and of Sir John Mandeville, Pliny's *Natural History* and the *Historia Rerum Ubique Gestarum* of Aeneas Sylvius Piccolomini (Pope Pius II). Columbus was not a scholarly man. Yet he studied these books, made hundreds of marginal notations in them and came out with ideas about the world that were characteristically simple and strong and sometimes wrong, the kind of ideas that the self-educated person gains from independent reading and clings to in defiance of what anyone else tries to tell him.

The strongest one was a wrong one—namely, that the distance between Europe and the eastern shore of Asia was short, indeed, that Spain was closer to China westward than eastward. Columbus never abandoned this conviction. And before he set out to prove it by sailing west from Spain, he studied his books to find out all he could about the lands that he would be visiting. From Marco Polo he learned that the Indies were rich in gold, silver, pearls, jewels and spices. The Great Khan, whose empire stretched from the Arctic to the Indian Ocean, had displayed to Polo a wealth and majesty that dwarfed the splendors of the courts of Europe.

Polo also had things to say about the ordinary people of the Far East. Those in the province of Mangi, where they grew ginger, were averse to war and so had fallen an easy prey to the khan. On Nangama, an island off the coast, described as having "great plentie of spices," the people were far from averse to war: they were anthropophagi—man-eaters—who devoured their captives. There were, in fact, man-eating people in several of the offshore islands, and in many islands both men and women dressed themselves with only a small scrap of cloth over their genitals. On the island of Discorsia, in spite of the fact that they made fine cotton cloth, the people went entirely naked. In one place there were two islands where men and women were segregated, the women on one island, the men on the other.

Marco Polo occasionally slipped into fables like this last one, but most of what he had to say about the Indies was the result of actual observation. Sir John Mandeville's travels, on the other hand, were a hoax—there was no such man—and the places he claimed to have visited in the 1300s were fantastically filled with one-eyed men and one-footed men, dog-faced men and men with two faces or no faces. But the author of the hoax did draw on the reports of enough genuine travelers to make some of his stories plausible, and he also drew on a legend as old as human dreams, the legend of a golden age when men were good. He told of an island where the people lived without malice or guile, without covetousness or lechery or gluttony, wishing for none of the riches of this world. They were not Christians, but they lived by the golden rule. A man who planned to see the Indies for himself could hardly fail to be stirred by the thought of finding such a people.



Bartolomé de Las Casas lamented that "the Spanishe have destroyed such an infinitie of soules" in their search for gold.

Columbus surely expected to bring back some of the gold that was supposed to be so plentiful. The spice trade was one of the most lucrative in Europe, and he expected to bring back spices. But what did he propose to do about the people in possession of these treasures?

When he set out, he carried with him a commission from the king and queen of Spain, empowering him "to discover and acquire certain islands and mainland in the ocean sea" and to be "Admiral and Viceroy and Governor therein." If the king and Columbus expected to assume dominion over any of the Indies or other lands en route, they must have had some ideas, not only about the Indies but also about themselves, to warrant the expectation. What had they to offer that would make their dominion welcome? Or if they proposed to impose their rule by force, how could they justify such a step, let alone carry it out? The answer is that they had two things: they had Christianity and they had civilization.

CHRISTIANITY has meant many things to many men, and its role in the European conquest and occupation of America was varied. But in 1492 to Columbus there was probably nothing very complicated about it. He would have reduced it to a matter of corrupt human beings, destined for eternal damnation, redeemed by a merciful savior. Christ saved those who believed in him, and it was the duty of Christians to spread his gospel and thus rescue the heathens from the fate that would otherwise await them.

Although Christianity was in itself a sufficient justification for dominion, Columbus would also carry civilization to the Indies; and this, too, was a gift that he and his contemporaries considered adequate recompense for anything they might take. When people talked about civilization—or civility, as they usually called it—they seldom specified precisely what they meant.

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Dr. Scott P. Stevens is Professor of Computer Information Systems and Management Science at James Madison University. He received his Ph.D. in Mathematics from The Pennsylvania State University. A frequent business consultant, Professor Stevens has been honored repeatedly for his remarkable teaching abilities.

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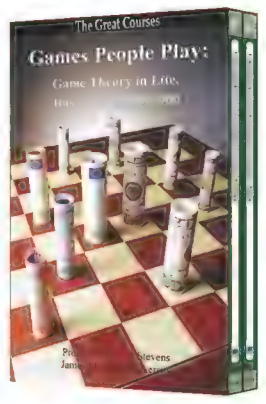

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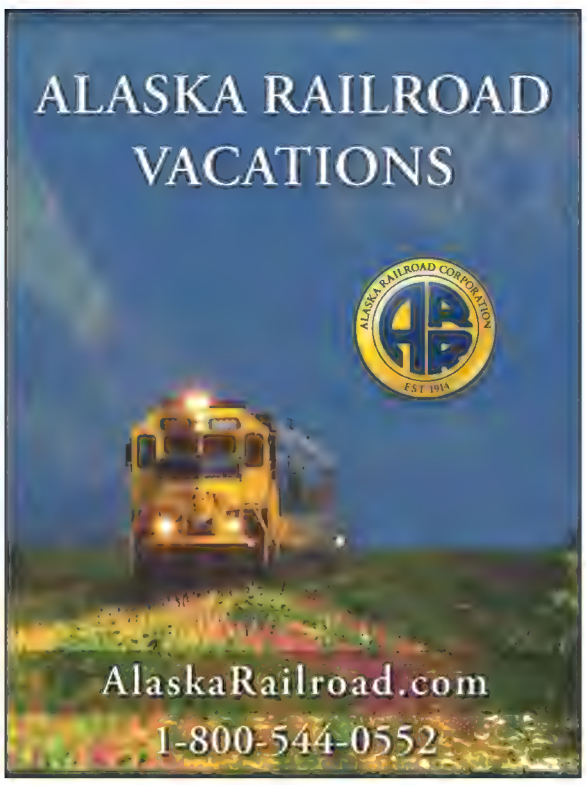

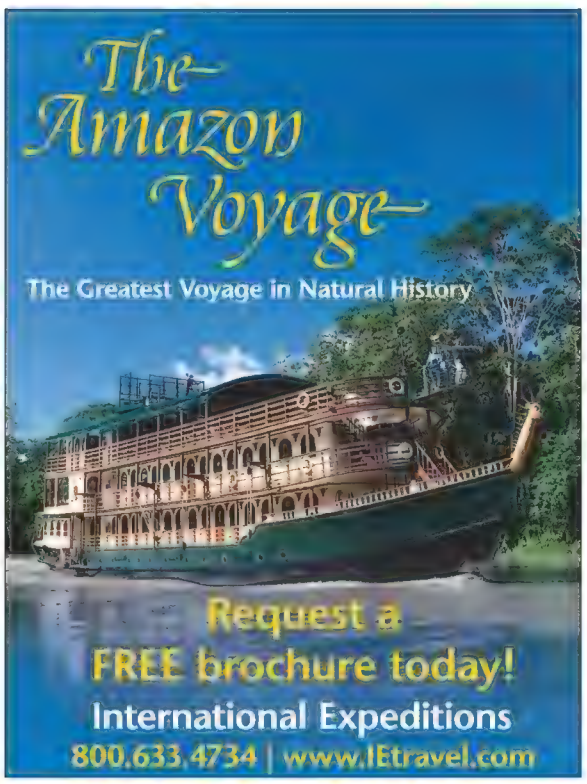

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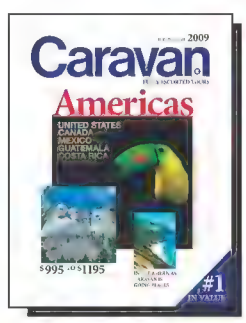

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Civility was closely associated with Christianity, but the two were not identical. Whereas Christianity was always accompanied by civility, the Greeks and Romans had had civility without Christianity. One way to define civility was by its opposite, barbarism. Originally the word "barbarian" had simply meant "foreigner"—to a Greek someone who was not Greek, to a Roman someone who was not Roman. By the 15th or 16th century, it meant someone not only foreign but with manners and customs of which civil persons disapproved. North Africa became known as Barbary, a 16th-century geographer explained, "because the people be barbarous, not onely in language, but in manners and customs." Parts of the Indies, from Marco Polo's description, had to be civil, but other parts were obviously barbarous: for example, the lands where people went naked. Whatever civility meant, it meant clothes.

But there was a little more to it than that, and there still is. Civil people distinguished themselves by the pains they took to order their lives. They organized their society to produce the elaborate food, clothing, buildings and other equipment characteristic of their manner of living. They had strong governments to protect property, to protect good persons from evil ones, to protect the manners and customs that differentiated civil people from barbarians. The superior clothing, housing, food and protection that attached to civilization made it seem to the European a gift worth giving to the ill-clothed, ill-housed and ungoverned barbarians of the world.

Slavery was an ancient instrument of civilization, and in the 15th century it had been revived as a way to deal with barbarians who refused to accept Christianity and the rule of civilized government. Through slavery they could be made to abandon their bad habits, put on clothes and reward their instructors with a lifetime of work. Throughout the 15th century, as the Portuguese explored the coast of Africa, large numbers of well-clothed

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sea captains brought civilization to naked savages by carrying them off to the slave markets of Seville and Lisbon.

Since Columbus had lived in Lisbon and sailed in Portuguese vessels to the Gold Coast of Africa, he was not unfamiliar with barbarians. He had seen for himself that the Torrid Zone could support human life, and he had observed how pleased barbarians were with trinkets on which civilized Europeans set small value, such as the little bells that falconers placed on hawks. Before setting off on his voyage, he laid in a store of hawk's bells. If the barbarous people he expected to find in the Indies should think civilization and Christianity an insufficient reward for submission to Spain, perhaps hawk's bells would help.

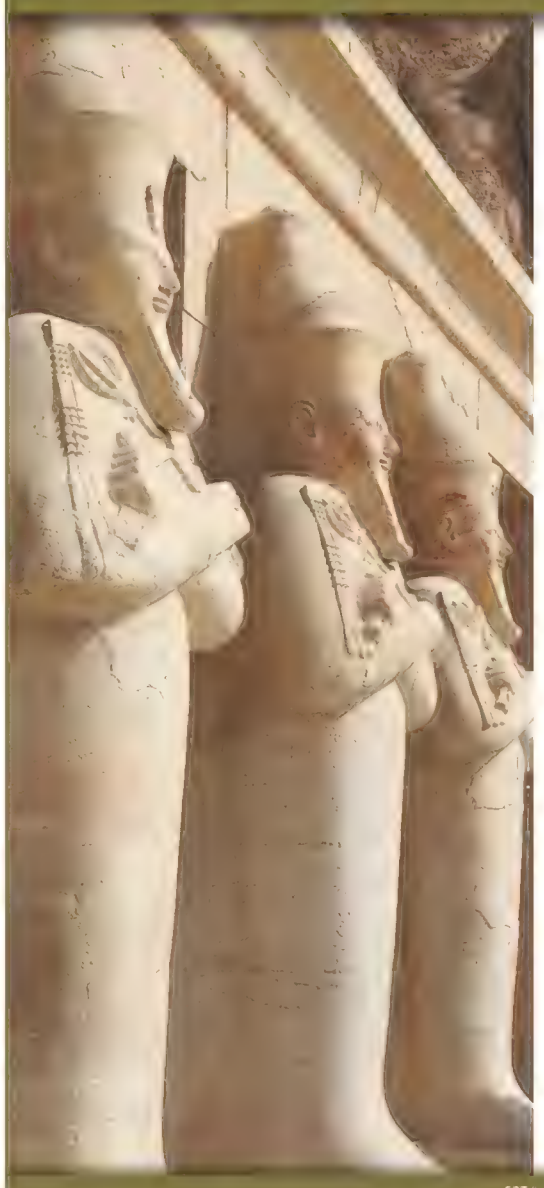
Columbus sailed from Palos de la Frontera on Friday, August 3, 1492, reached the Canary Islands six days later and stayed there for a month to finish outfitting his ships. He left on September 6, and five weeks later, in about the place he expected, he found the Indies. What else could it be but the Indies? There on the shore were the naked people. With hawk's bells and beads he made their acquaintance and found some of them wearing gold nose plugs. It all added up. He had found the Indies. And not only that. He had found a land over which he would have no difficulty in establishing Spanish dominion, for the people showed him an immediate veneration. He had been there only two days, coasting along the shores of the islands, when he was able to hear the natives crying in loud voices, "Come and see the men who have come from heaven; bring them food and drink." If Columbus thought he was able to translate the language in two days' time, it is not surprising that what he heard in it was what he wanted to hear or that what he saw was what he wanted to see—namely, the Indies, filled with people eager to submit to their new admiral and viceroy.

Columbus made four voyages to America, during which he explored an astonishingly large area of the Caribbean and a part of the northern coast of South America. At every island

the first thing he inquired about was gold, taking heart from every trace of it he found. And at Haiti he found enough to convince him that this was Ophir, the country to which Solomon and Jehosophat had sent for gold and silver. Since its lush vegetation reminded him of Castile, he renamed it Española, the Spanish island, which was later Latinized as Hispaniola.

Española appealed to Columbus from his first glimpse of it. From aboard ship it was possible to make out rich fields waving with grass. There were good harbors, lovely sand beaches and fruit-laden trees. The people were shy and fled whenever the caravels approached the shore, but Columbus gave orders "that they should take some, treat them well and make them lose their fear, that some gain might be made, since, considering the beauty of the land, it could not be but that there was gain to be got." And indeed there was. Although the amount of gold worn by the natives was even less than the amount of clothing, it gradually became apparent that there was gold to be had. One man possessed some that had been pounded into gold leaf. Another appeared with a gold belt. Some produced nuggets for the admiral. Española accordingly became the first European colony in America. Although Columbus had formally taken possession of every island he found, the act was mere ritual until he reached Española. Here he began the European occupation of the New World, and here his European ideas and attitudes began their transformation of land and people.

THE ARAWAK INDIANS of Española were the handsomest people that Columbus had encountered in the New World and so attractive in character that he found it hard to praise them enough. "They are the best people in the world," he said, "and beyond all the mildest." They cultivated a bit of cassava for bread and made a bit of cottonlike cloth from the fibers of the gossampine tree. But they spent most of the day like children idling away their time from morning to night, seemingly



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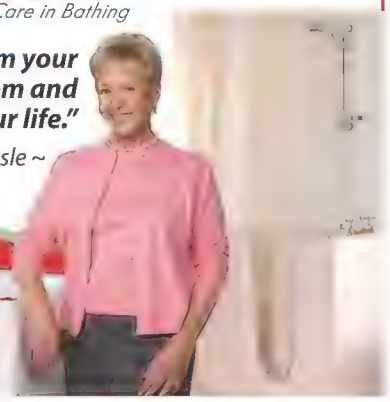

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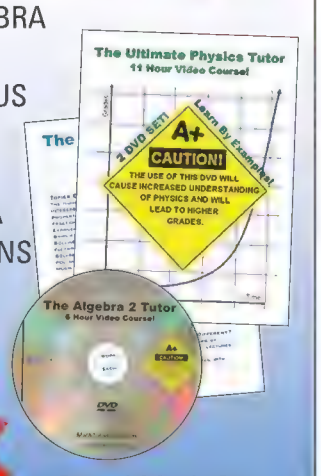
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without a care in the world. Once they saw that Columbus meant them no harm, they outdid one another in bringing him anything he wanted. It was impossible to believe, he reported, "that anyone has seen a people with such kind hearts and so ready to give the Christians all that they possess, and when the Christians arrive, they run at once to bring them everything."

To Columbus the Arawaks seemed like relics of the golden age. On the basis of what he told Peter Martyr, who recorded his voyages, Martyr wrote, "they seeme to live in that golden worlde of the which olde writers speake so much, wherein menne lived simply and innocently without enforcement of lawes, without quarreling, judges and libelles, content onely to satisfie nature, without further vexation for knowledge of things to come."

As the idyllic Arawaks conformed to one ancient picture, their enemies the Caribs conformed to another that Columbus had read of, the anthropophagi. According to the Arawaks, the Caribs, or Cannibals, were man-eaters, and as such their name eventually entered the English language. (This was at best a misrepresentation, which Columbus would soon exploit.) The Caribs lived on islands of their own and met every European approach with poisoned arrows, which men and women together fired in showers. They were not only fierce but, by comparison with the Arawaks, also seemed more energetic, more industrious and, it might even be said, sadly enough, more civil. After Columbus succeeded in entering one of their settlements on his second voyage, a member of the expedition reported, "This people seemed to us to be more civil than those who were in the other islands we have visited, although they all have dwellings of straw, but these have them better made and better provided with supplies, and in them were more signs of industry."

Columbus had no doubts about how to proceed, either with the lovable but lazy Arawaks or with the hateful but industrious Caribs. He had come

to take possession and to establish dominion. In almost the same breath, he described the Arawaks' gentleness and innocence and then went on to assure the king and queen of Spain, "They have no arms and are all naked and without any knowledge of war, and very cowardly, so that a thousand of them would not face three. And they are also fitted to be ruled and to be set to work, to cultivate the land and to do all else that may be necessary, and you may build towns and teach them to go clothed and adopt our customs."

So much for the golden age. Columbus had not yet prescribed the method by which the Arawaks would be set to work, but he had a pretty clear idea of how to handle the Caribs. On his second voyage, after capturing a few of them, he sent them in slavery to Spain, as samples of what he hoped would be a regular trade. They were obviously intelligent, and in Spain they might "be led to abandon that inhuman custom which they have of eating men, and there in Castile, learning the language, they will much more readily receive baptism and secure the welfare of their souls." The way to handle the slave trade, Columbus suggested, was to send ships from Spain loaded with cattle (there were no native domestic animals on Española), and he would return the ships loaded with supposed Cannibals. This plan was never put into operation, partly because the Spanish sovereigns did not approve it and partly because the Cannibals did not approve it. They defended themselves so well with their poisoned arrows that the Spaniards decided to withhold the blessings of civilization from them and to concentrate their efforts on the seemingly more amenable Arawaks.

The process of civilizing the Arawaks got underway in earnest after the *Santa Maria* ran aground on Christmas Day, 1492, off Caracol Bay. The local leader in that part of Española, Guacanagari, rushed to the scene and with his people helped the Spaniards to salvage everything aboard. Once again Columbus was overjoyed with the remarkable natives. They are, he wrote, "so full of love and

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without greed, and suitable for every purpose, that I assure your Highnesses that I believe there is no better land in the world, and they are always smiling." While the salvage operations were going on, canoes full of Arawaks from other parts of the island came in bearing gold. Guacanagari "was greatly delighted to see the admiral joyful and understood that he desired much gold." Thereafter it arrived in amounts calculated to console the admiral for the loss of the *Santa Maria*, which had to be scuttled. He decided to make his permanent headquarters on the spot and accordingly ordered a fortress to be built, with a tower and a large moat.

What followed is a long, complicated and unpleasant story. Columbus returned to Spain to bring the news of his discoveries. The Spanish monarchs were less impressed than he with what he had found, but he was able to round up a large expedition of Spanish colonists to return with him and help exploit the riches of the Indies. At Española the new settlers built forts and towns and began helping themselves to all the gold they could find among the natives. These creatures of the golden age remained generous. But precisely because they did not value possessions, they had little to turn over. When gold was not forthcoming, the Europeans began killing. Some of the natives struck back and hid out in the hills. But in 1495 a punitive expedition rounded up 1,500 of them, and 500 were shipped off to the slave markets of Seville.

The natives, seeing what was in store for them, dug up their own crops of cassava and destroyed their supplies in hopes that the resulting famine would drive the Spaniards out. But it did not work. The Spaniards were sure there was more gold in the island than the natives had yet found, and were determined to make them dig it out. Columbus built more forts throughout the island and decreed that every Arawak of 14 years or over was to furnish a hawk's bell full of gold dust every three months. The various local leaders were made responsible for seeing that

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the tribute was paid. In regions where gold was not to be had, 25 pounds of woven or spun cotton could be substituted for the hawk's bell of gold dust.

Unfortunately Española was not Ophir, and it did not have anything like the amount of gold that Columbus thought it did. The pieces that the natives had at first presented him were the accumulation of many years. To fill their quotas by washing in the riverbeds was all but impossible, even with continual daily labor. But the demand was unrelenting, and those who sought to escape it by fleeing to the mountains were hunted down with dogs taught to kill. A few years later Peter Martyr was able to report that the natives "beare this yoke of servitude with an evill will, but yet they beare it."

The tribute system, for all its injustice and cruelty, preserved something of the Arawaks' old social arrangements: they retained their old leaders under control of the king's viceroy, and royal directions to the viceroy might ultimately have worked some mitigation of their hardships. But the Spanish settlers of Española did not care for this centralized method of exploitation. They wanted a share of the land and its people, and when their demands were not met they revolted against the government of Columbus. In 1499 they forced him to abandon the system of obtaining tribute through the Arawak chieftains for a new one in which both land and people were turned over to individual Spaniards for exploitation as they saw fit. This was the beginning of the system of *repartimientos* or *encomiendas* later extended to other areas of Spanish occupation. With its inauguration, Columbus' economic control of Española effectively ceased, and even his political authority was revoked later in the same year when the king appointed a new governor.

For the Arawaks the new system of forced labor meant that they did more work, wore more clothes and said more prayers. Peter Martyr could rejoice that "so many thousands of men are received to bee the sheepe of Christes

flocke." But these were sheep prepared for slaughter. If we may believe Bartolomé de Las Casas, a Dominican priest who spent many years among them, they were tortured, burned and fed to the dogs by their masters. They died from overwork and from new European diseases. They killed themselves. And they took pains to avoid having children. Life was not fit to live, and they stopped living. From a population of 100,000 at the lowest estimate in 1492, there remained in 1514 about 32,000 Arawaks in Española. By 1542, according to Las Casas, only 200 were left. In their place had appeared slaves imported from Africa. The people of the golden age had been virtually exterminated.

WHY? WHAT IS THE MEANING OF this tale of horror? Why is the first chapter of American history an atrocity story? Bartolomé de Las Casas had a simple answer, greed: "The cause why the Spanishe have destroyed such an infinitie of soules, hath been onely, that they have helde it for their last scope and marke to gette golde." The answer is true enough. But we shall have to go further than Spanish greed to understand why American history began this way. The Spanish had no monopoly on greed.

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But even as the Europeans admired the Indians' simplicity, they were troubled by it, troubled and offended. Innocence never fails to offend, never fails to invite attack, and the Indians seemed the most innocent people any-

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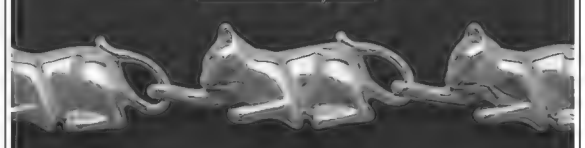

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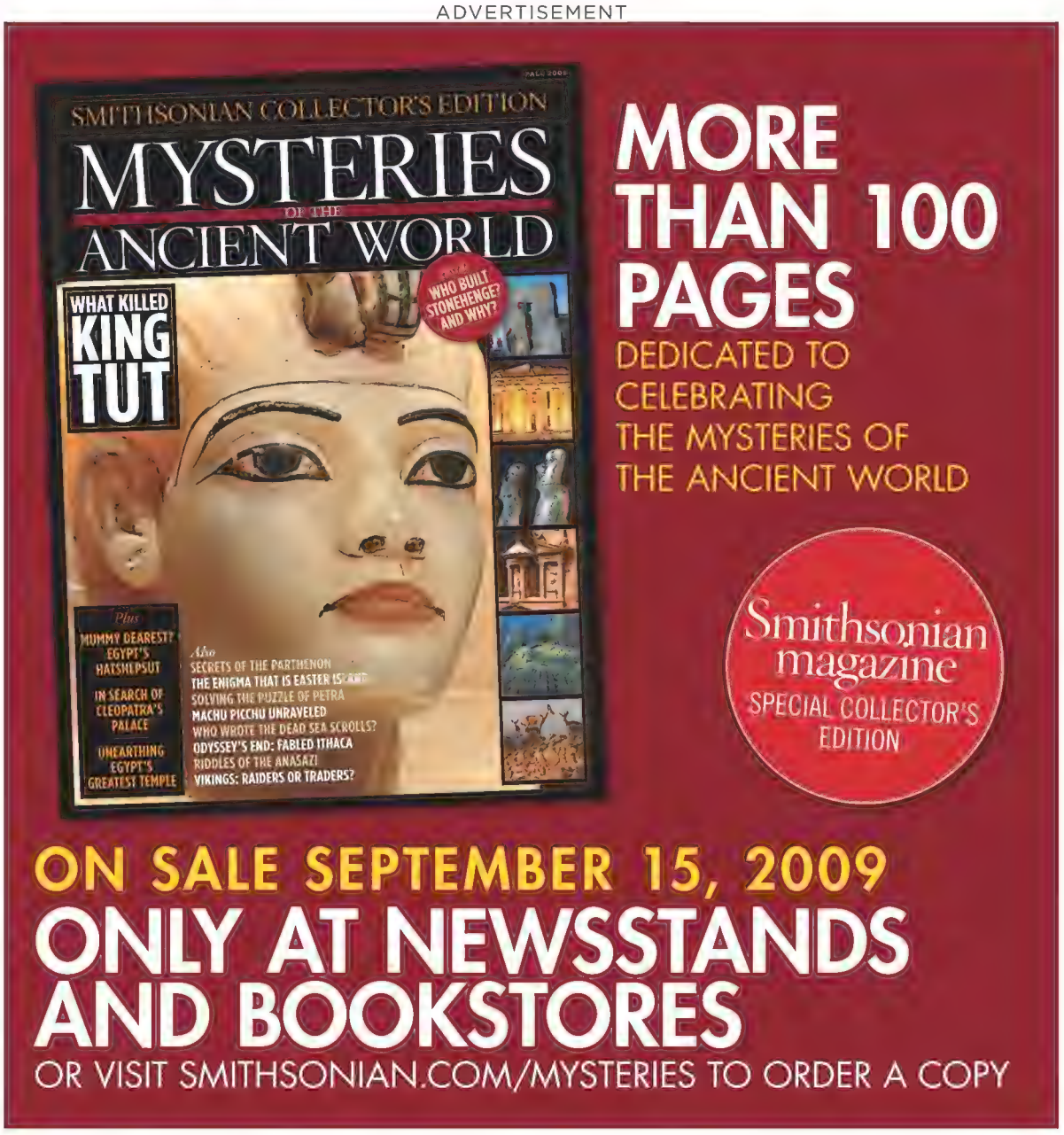
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one had ever seen. Without the help of Christianity or of civilization, they had attained virtues that Europeans liked to think of as the proper outcome of Christianity and civilization. The fury with which the Spaniards assaulted the Arawaks even after they had enslaved them must surely have been in part a blind impulse to crush an innocence that seemed to deny the Europeans' cherished assumption of their own civilized, Christian superiority over naked, heathen barbarians.

That the Indians were destroyed by Spanish greed is true. But greed is simply one of the uglier names we give to the driving force of modern civilization. We usually prefer less pejorative names for it. Call it the profit motive, or free enterprise, or the work ethic, or the American way, or, as the Spanish did, civility. Before we become too outraged at the behavior of Columbus and his followers, before we identify ourselves too easily with the lovable Arawaks, we have to ask whether we could really get along without greed and everything that goes with it. Yes, a few of us, a few eccentrics, might manage to live for a time like the Arawaks. But the modern world could not have put up with the Arawaks any more than the Spanish could. The story moves us, offends us, but perhaps the more so because we have to recognize ourselves not in the Arawaks but in Columbus and his followers.

The Spanish reaction to the Arawaks was Western civilization's reaction to the barbarian: the Arawaks answered the Europeans' description of men, just as Balboa's tiger answered the description of a tiger, and being men they had to be made to live as men were supposed to live. But the Arawaks' view of man was something different. They died not merely from cruelty, torture, murder and disease, but also, in the last analysis, because they could not be persuaded to fit the European conception of what they ought to be.

EDMUND S. MORGAN *is a Sterling Professor emeritus at Yale University.*

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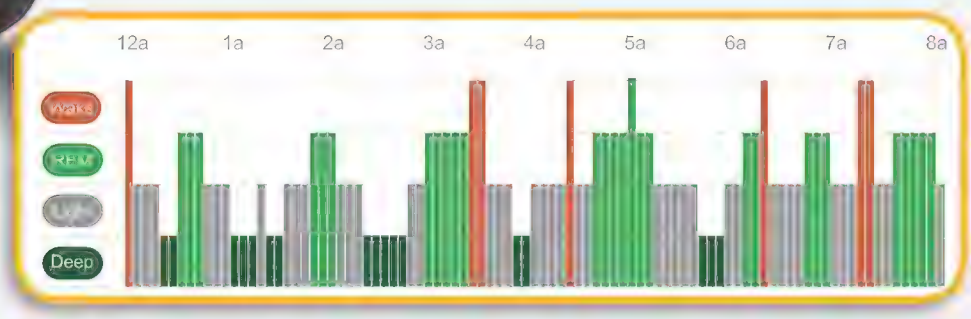

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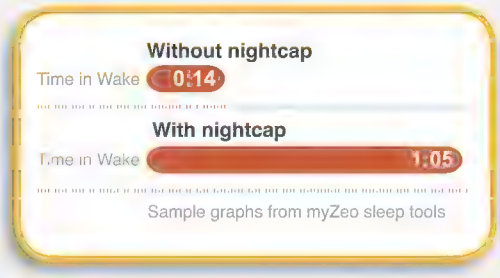

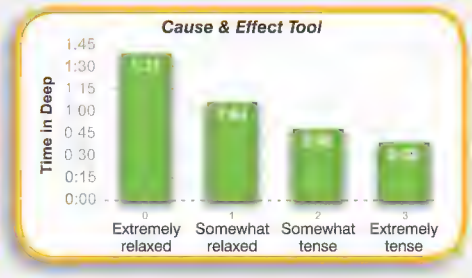

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Early in life there is one thing that people learn about natural laws: laws of nature do their own enforcing, and when not obeyed, they do their own punishing. The mere *attempt* to disobey a natural law, intended or not, exposes a person to whatever punishment that law imposes.

Richard W. Wetherill
1906-1989

Clearly laws of nature call for ***obedience*** or else. The "or else" keeps people eager to comply, especially when they know what the or else will be.

Man-made laws require ***mankind*** enforcement, so we find that man-made laws are often violated with seeming impunity unless violators are apprehended, charged, prosecuted, and sentenced by mankind enforcement.

Natural laws do not tolerate people's disobedience, a factor missing in mankind's laws. Most people feel free to ignore any man-made law whenever that seems to serve their purposes.

Because there are differing beliefs as to whoever or whatever the creator is, people fail to put their attention on the relevant fact that ***it is creation's natural laws that rule planet Earth and its inhabitants***. Those differing beliefs also tend to divert proper attention from the basic cause of people's willful behavior.

There is a change that people must make that is ***vital*** to their well-being. But blocking that change is their unawareness that they are continually disobeying the dictates of a little-known natural law.

That little-known law was identified by the late Richard W. Wetherill decades ago. He called it the ***law of absolute right***. It states ***right action gets right results; wrong action gets wrong results***. It is *the* self-enforcing law that delivers the results of everybody's right or wrong behavior. When right, rational, and honest behavior is taken, situations are resolved. When behavior fails to meet nature's criteria, situations are unresolved and remain troublesome.

People have to know that whatever happens to them is the result of *their* input caused by trying to get their way. That is why there is on-going warfare, political turmoil, economic chaos, and eroding freedom to name a few serious problems facing the public. Clearly natural law is forced to deliver wrong results when caused by the input from people's irrational, dishonest, wrong reactions to whatever happens.

Nature's ***law of absolute right*** is *the* self-enforcing law that when conformed to lifts people from a quagmire of problems and trouble. It is *the* law that transforms individuals and groups into rational, honest, right-minded citizens.

Using money as a solution never lastingly resolved troublesome human affairs, as evidenced by people's continuingly mounting wrong results. Surely ***human problems and trouble continue to defy solution by use of any man-made procedure***.

Over the past decade a group of Wetherill's former students has been financing public-service advertising, letting people know that ***there is a solution for all that is wrong in human affairs***.

Right results are delivered by natural law only when causal behavior conforms to the law's requirements, which is the very behavior of successful scientists when they conform to nature's laws of physics.

Wetherill taught that it takes a changeless decision to stop pitting our behavior against whoever or whatever created Earth, its laws, and its people. The behavioral law then serves its purpose to deliver right results, not wrong results. People's right behavior finally results in the "heaven on earth" intended by whoever or whatever the creator is!

To provide information about nature's behavioral law of absolute right to people worldwide, our essays and books are available on our Website www.alphapub.com. They can be read or downloaded FREE. To speak with someone, call 800-992-9124 9am-4pm ET or write to The Alpha Publishing House, 411 Eagleview Blvd, Ste 100, Exton, PA 19341.

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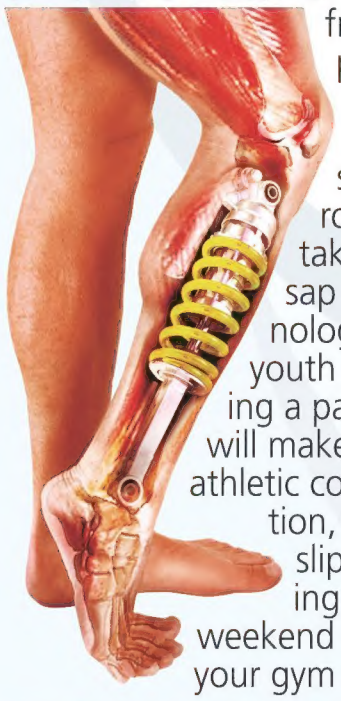

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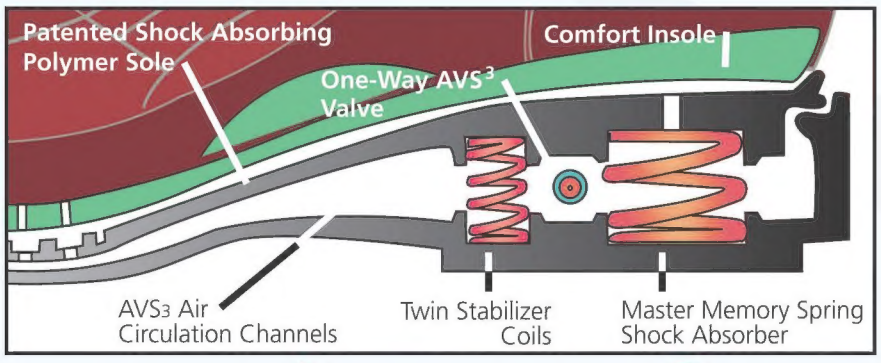

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UBI in the Knife and Gun Club

The secret language of doctors and nurses

BY RICHARD CONNIFF

YOUNG DOCTORS THESE DAYS get trained to talk nice, think pretty thoughts and steer clear of malpractice lawyers. So the colorful subculture of medical slang is probably CTD ("circling the drain"), if not DOA ("dead on arrival"), and that may be a good thing. It was probably a little insensitive when doctors sticking a pulmonary artery catheter into a plus-sized person referred to it as "harpooning." And it was never great bedside manner to remark that a newly arrived motorcycle crash victim was GPO ("good for parts only").

But in the bad old days, when medical life was more free-wheeling, "MASH"-style humor was commonplace. Patient reports were safely stashed away in the back office, so doctors felt free to scribble cryptic little notes to themselves, like FLK ("funny-looking kid") or even FLK with GLM ("good-looking mom"). The LOL in NAD ("little old lady in no acute distress") was the bread-and-butter of many medical practices, at least until she got transferred to the ECU ("eternal care unit"). Or sometimes her family dumped her at the Knife and Gun Club ("emergency room") without cause, generally as they were racing off on vacation. When that happened, the language used by harried ER staffers tended to become unprintable.

If patients had trouble understanding instructions, doctors sometimes labeled them CNS-QNS ("central nervous system—quotient not sufficient") or just plain NTB ("not too bright"). In England, where getting "pissed," or drunk, at the local pub was a popular route to CNS-QNS, doctors often categorized patients as PFO, PGT or PDE ("pissed, fell over," "pissed, got thumped," "pissed, denies everything"). Less diagnostically precise, though still useful, was the bruised and battered catchall category UBI ("unexplained beer injury").

To be fair, doctors often directed their callous argot not just at patients but also at one another. Depending on specialty, a doctor could be a "gas passer," "nose picker," "crotch doc" or "rear admiral." Surgeons were "knife happy" or "slashers," while "fossil docs" learned everything they knew back when mustard plaster was cutting edge.

Especially for interns and residents, "developing our own private lingo made us part of a club (or a gang) who looked out for each other," one middle-aged doctor recalls. They shared the experience of getting PIMPED ("put in my place") by a hostile elder firing questions drill-sergeant style. For the real horrors of their work, referring to blood as "the house red" or to burn victims as "crispy critters" put the pain at a bearable distance.

The slang was no doubt also a way to vent unwholesome attitudes. Categorizing a patient as FOS (which does not mean "full of sense") or suffering from TMB ("too many birthdays") probably would not meet the standards of modern compassionate care. So good riddance, to be sure.

And yet a part of me also regrets the idea that doctors now get discouraged from even thinking, much less expressing, what any human being in their position might naturally feel. The other day, for instance, I showed up at my eye doctor to get new glasses. The nurse led me through the usual tests, and I wound up sheepishly admitting what had happened to my old glasses. We need not get into all the messy details here. Let's just say that it involved storing my glasses in my shoes and, later, walking around for a while before I noticed that something underfoot felt oddly crunchy.

The nurse looked at me for a moment, possibly searching for a UBI, or trying to decide if I was a pumpkin ("you shine a light in the ear and the whole skull lights up").

Then she murmured to herself, "NTB," and I could hardly disagree with her diagnosis.

RICHARD CONNIFF's *newest book is* Swimming With Piranhas at Feeding Time: My Life Doing Dumb Stuff With Animals.

ERIC PALMA